Technologie

User's manual of the APRWIN64 software for Windows

(Measurements processing and transmission software for the APR64)

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Information

The use of the APRWIN64 software requires a good knowledge of the APR. If not, we advise you to refer to all own user's manuals :

- User's guide of APR64
- User's guide of APR64M
- User's guide of Time synchronization for APR64 / APR64M
- User's guide for measurement unit BFOP2
- User's guide for Digital Remote Unit DRU
- Install guide for APR64
- First-start guide for APR64

APRWIN Software is protected against copy by laws but you are authorized to install this software on several PC (A desktop PC and a portable PC for example).

Minimal configuration for using APRWIN64

- Centrino Duo
- Windows XP
- 2Go Ram
- 40Go of free disk
- Graphic card 1024 x 768
- DVD Burner
- Deskjet or Laserjet printer A4

Caution : Sometimes the administrator locks the access of your PC (registers …). In this case APRWIN64 may causes some bugs. In case of problem, ask your administrator to modify the access of your PC.

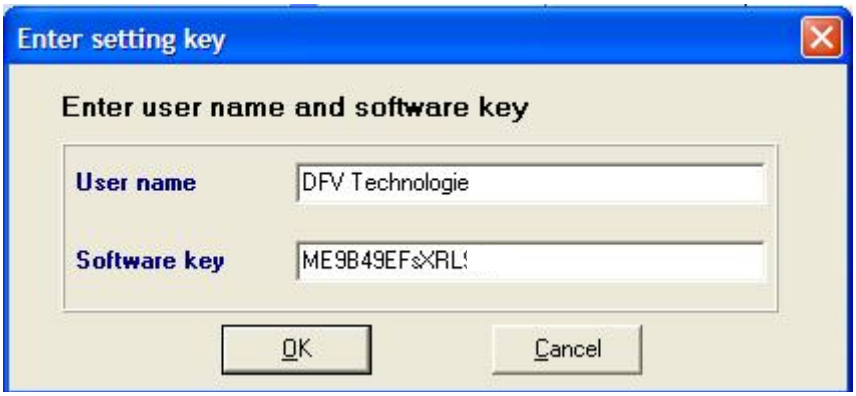
Installation

Insert the DVD or CDROM into the DVD-Player to start the software installation on your PC. If the AUTORUN mode is confirmed on your system, the installation is going to start automatically, otherwise it will be necessary to execute SETUP.EXE program from the DVD/CDROM

Then, follow the instructions of the set-up program (It is advised not to change the paths and names by default).

Note : The installation of a new version does not requires an uninstallation.

At first running, the software asks to enter a key. Enter the user name and the key supplied with the DVD/CDROM (The key is notified on the last page of the user's guide).



Notes :

- Enter small letters / capital letters for required key and name.

- You can not use the "O" letter for the software key.

The directory of installation is \program files\aprwin64.

If you want to backup the configuration, copy only this directory. All the setup is stored in it.

General Description

The APRWIN64 allows you to drive APR64 DFR and APR64M Analyzers with a PC equipped with Windows operating system.

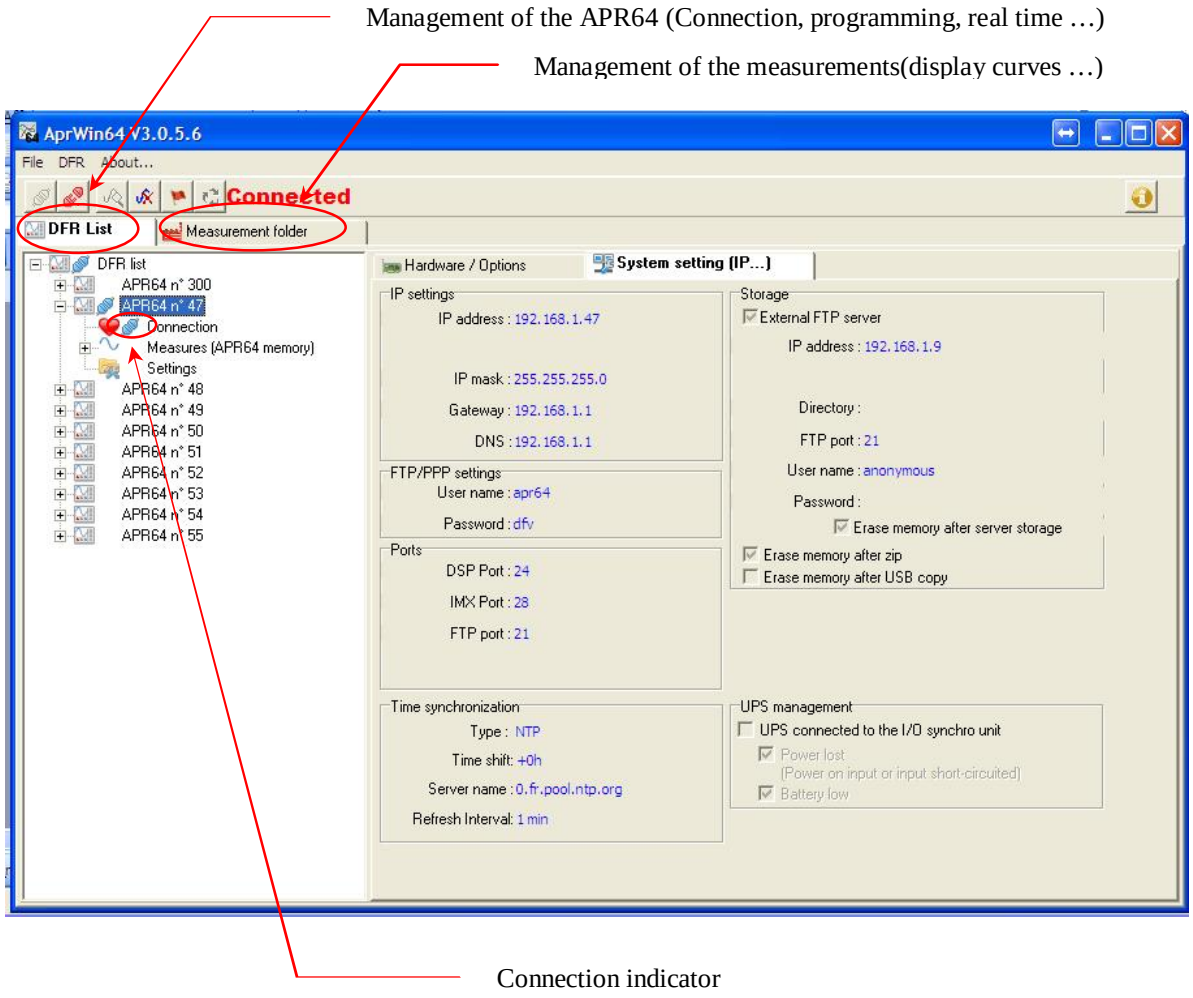
The APRWIN software lets you :

- To drive independently all the APR64(M)
- To display measurements of APR64(M) in real time
- To analyze the measurements of APR64(M)
- To analyze the measurements of the APR8, APRV, APR16, APR4U4I and ELODI (option).
- To analyze COMTRADE file (ASCII or BINARY) (options)
- To export the data in COMTRADE (option) or EXCEL
- To make reports (with WORD for exemple) using copy/paste function.

Overview of the Software

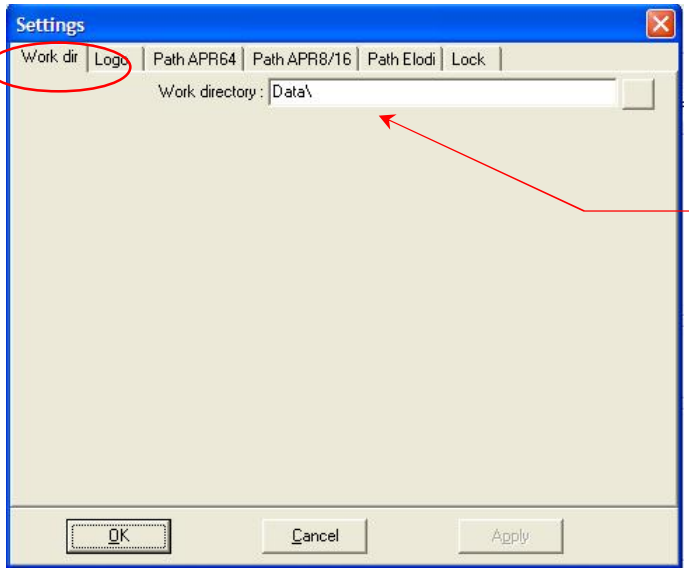
When starting the software display the site manager.

The manager allows you to access all the menus and functions (Configuration, setup, communication, display, printing …)

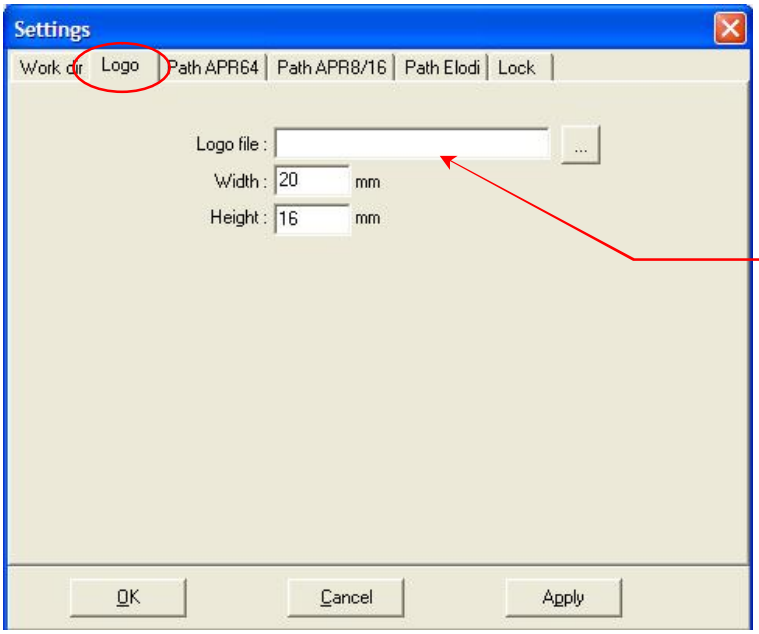


Configuration Menu

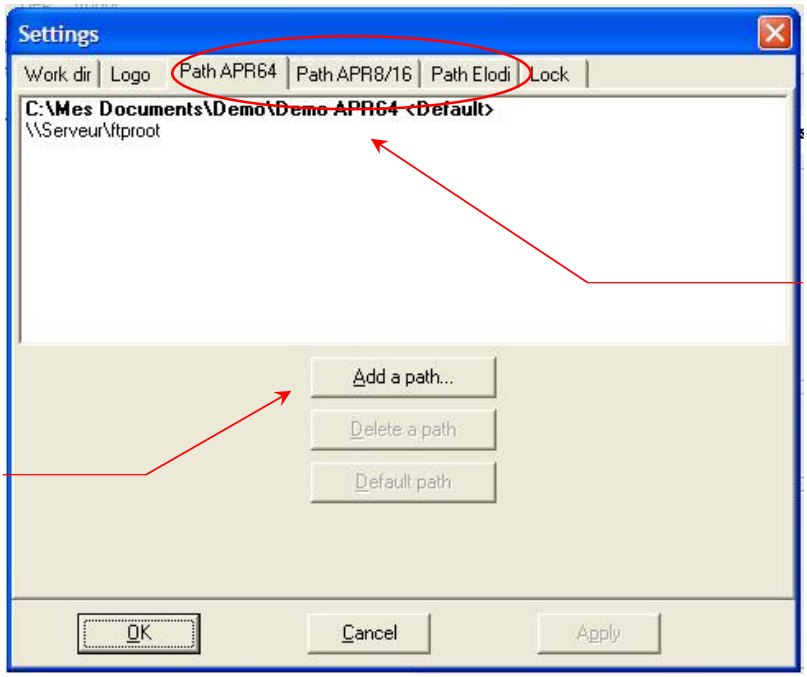
This menu allows to setup work directory, logo and password.



By default the parameters are stored in the Data directory.

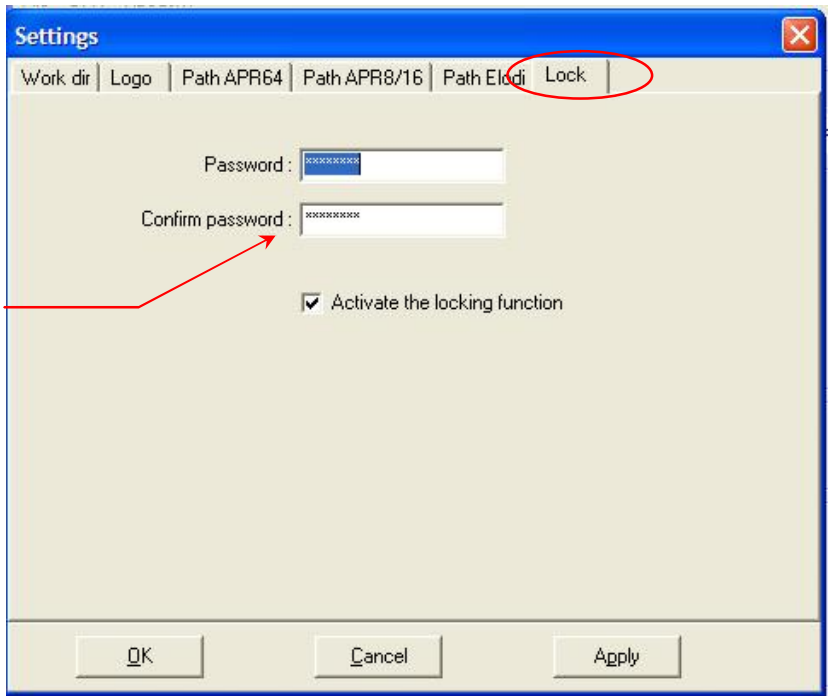


Choice of the logo file. By default (if empty) the DFV logo is used.



Choice of the storage directory for each kind of unit.
The default directory will be used when importing data to the PC.

You can choose more than one directory
Be carefull, directories cannot be defined on removable devices.

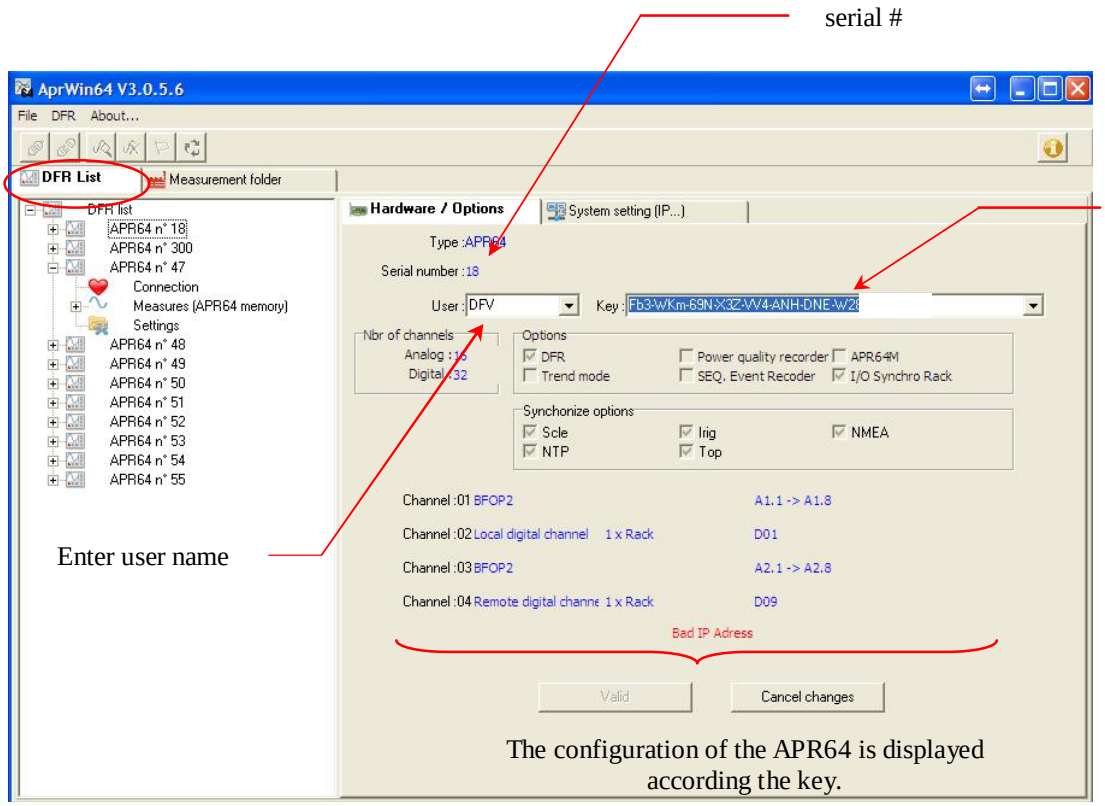


The access at the Software can be locked with a password. When locked the user can only display data (Programming and erase not possible).

Creating a new unit

In order to communicate and programming an APR64(M), you need to create it in the database of the DFR List.
"Measurement folder" allows to analyze measurements files (APR64, APR16, ELODI, CSV and COMTRADE files) (Options).

Creating a unit APR64

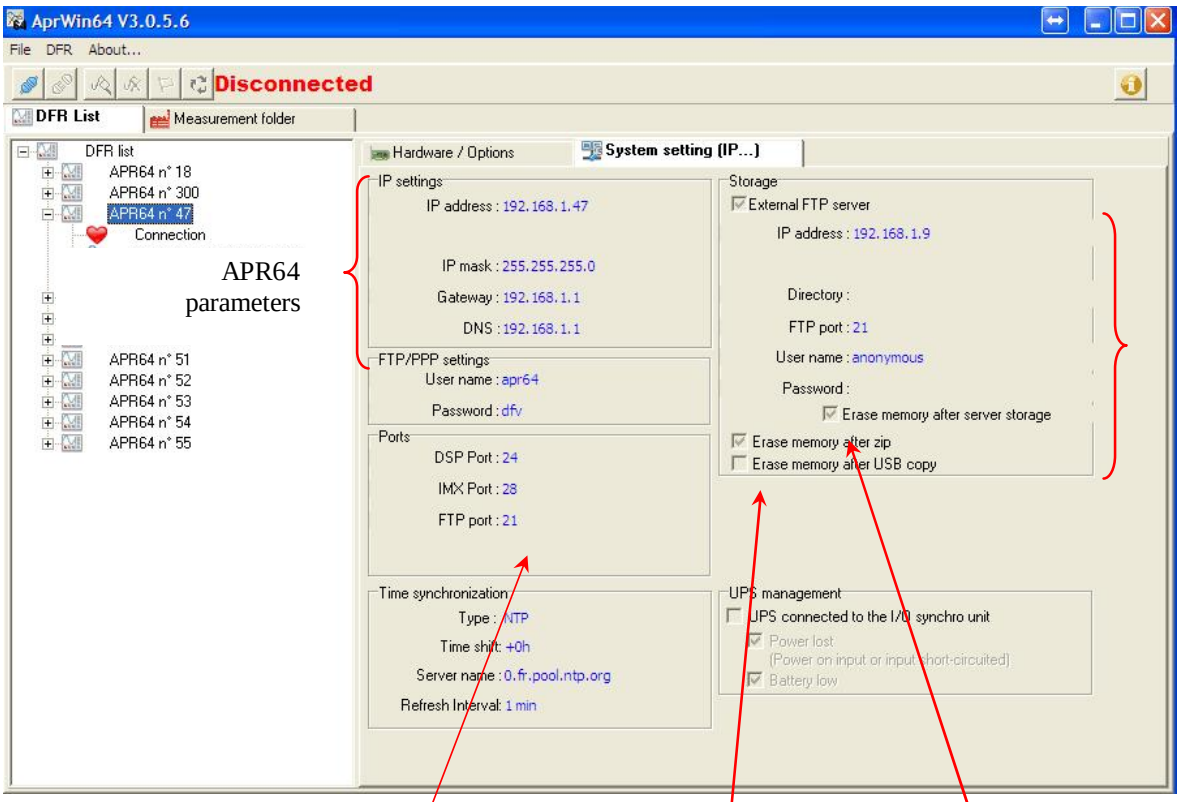


The key and user name are given by DFV when buying the APR64. In case of upgrade or option DFV give you a new one.

This key determines the configuration of the APR64 (number of active channels, number of digital racks, type of channels BFOP or DRU).

After validation the APR64 is created in the DFR manager (See following page).

When creating a unit APR64, it is necessary to enter parametrers (IP adresse, storage place …). These caracteristics will be used to configurate the APR64.
Thes caracteristics are stored in an USB key. When starting the first time, APR64 reads the USB key and then configures itself.



APR64 parameters

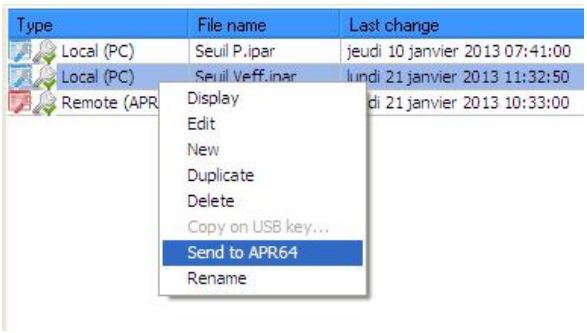
FTP server parameters

Communication ports to be configured in order to access to the APR64.

Validate to erase internal memory after copy on an USB key.

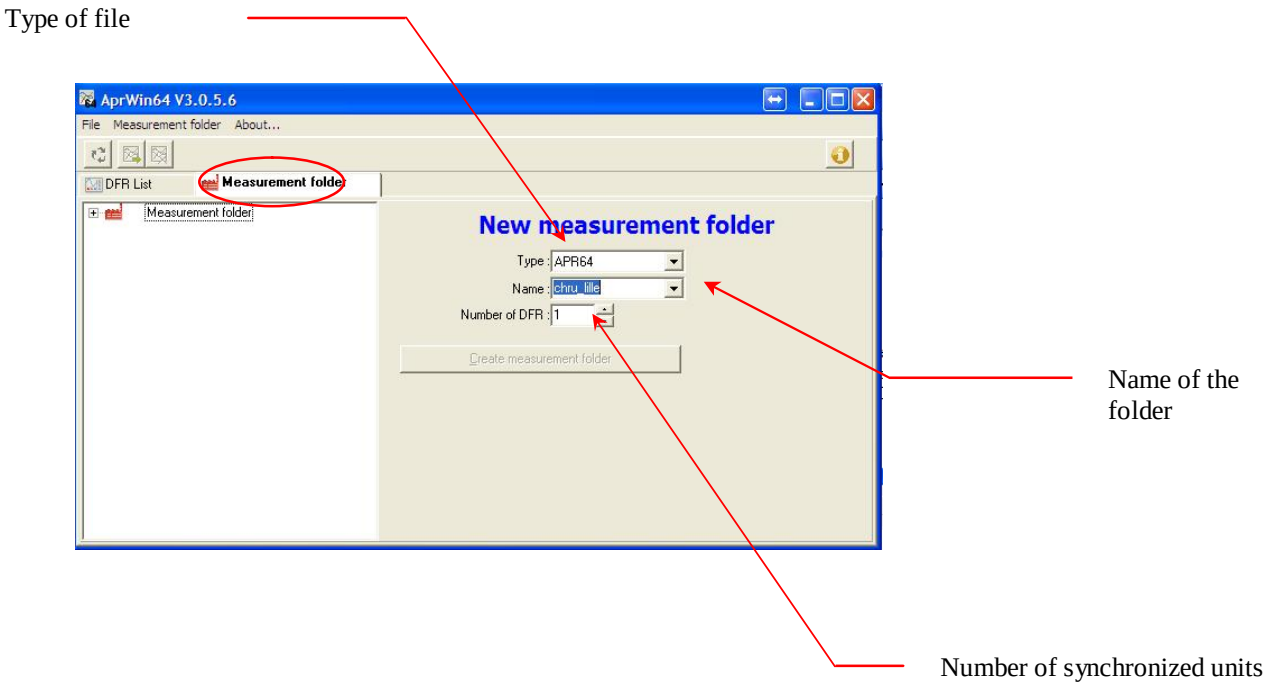
Validate to erase internal memory after storage on FTP server

Note : Programming the APR64 using an USB key is only necessary the first time. When the IP address of the APR64 is set, the PC can communicate with the APR64.



Creating measurement folder

Measurement folders allows to collect the data files from the different kind of units (APR64, APR4U4I, APR16, APRV) or from other manufacturers in option (COMTRADE file).



Storage of measurements on APR64

Recorded measures are stored on the PC at the place defided in the configuration menu. This place be local or remote (on a data server)

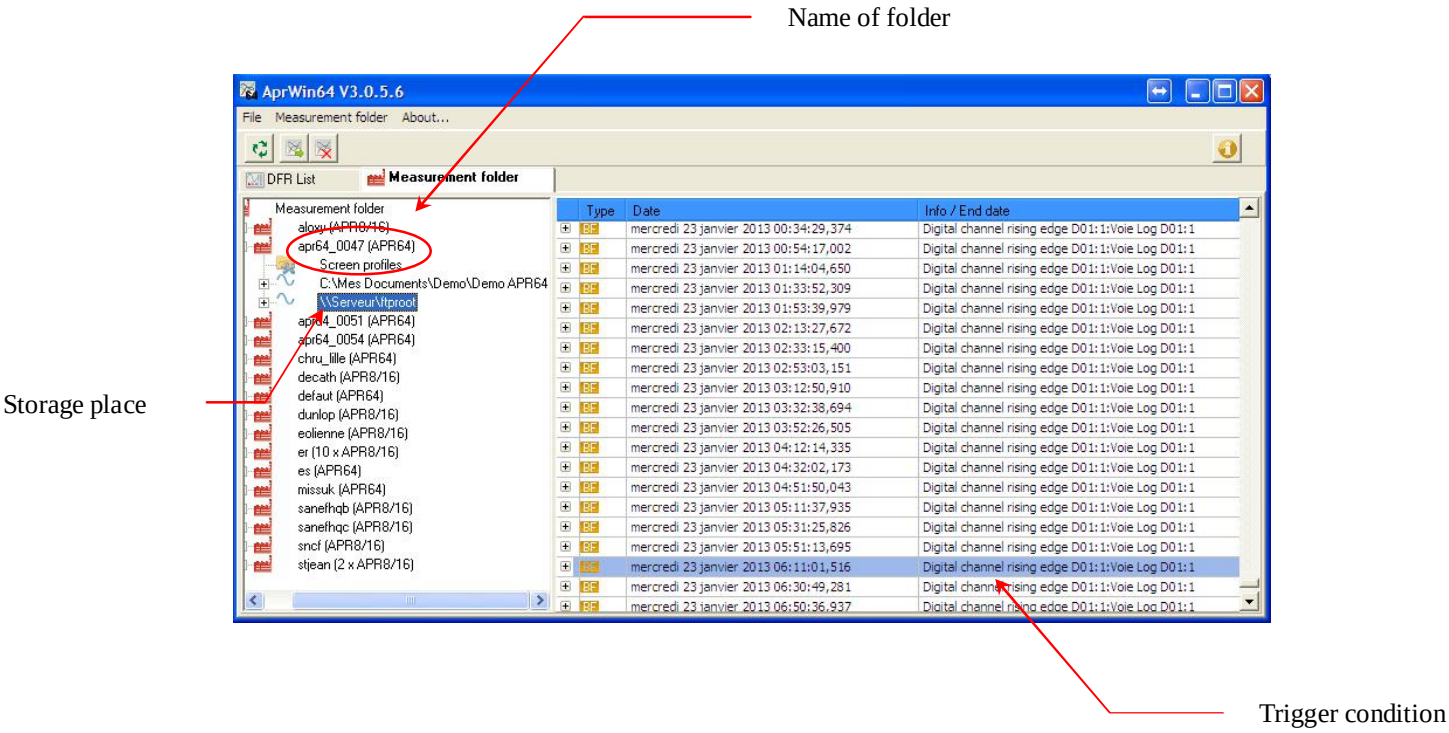
The APR64 measurements files have this structure :
aaaammjj.rep\aaaammjj_hhmnsscs_ ……. . dat, hdr,cfg for the original files and .tar.gz for the compressed files.

The APRWIN64 Software can deal with either original files or compressed files.

The files are organized like that in APRWIN64 Software :

Name folder
YEARMONTH
DAY1
DAY2

In order to see the measurement file list, you only have to click on the desired folder


Name of folder
Storage place
Trigger condition
AprWin64 V3.0.5.6
File Measurement folder About...
DFR List
Measurement folder
Measurement folder
apr64_0047 (APR64)
Screen profiles
C:\Mes Documents\Demo\Demo APR64
\\Serveur\ftproot
apr64_0051 (APR64)
apr64_0054 (APR64)
chru_lille (APR64)
decath (APR8/16)
defaut (APR64)
dunlop (APR8/16)
eolienne (APR8/16)
er (10 x APR8/16)
es (APR64)
missuk (APR64)
sanefhqb (APR8/16)
sanefhqc (APR8/16)
sncf (APR8/16)
stjean (2 x APR8/16)
Type
Date
Info / End date
mercredi 23 janvier 2013 00:34:29,374 Digital channel rising edge D01:1:Voie Log D01:1
mercredi 23 janvier 2013 00:54:17,002 Digital channel rising edge D01:1:Voie Log D01:1
mercredi 23 janvier 2013 01:14:04,650 Digital channel rising edge D01:1:Voie Log D01:1
mercredi 23 janvier 2013 01:33:52,309 Digital channel rising edge D01:1:Voie Log D01:1
mercredi 23 janvier 2013 01:53:39,979 Digital channel rising edge D01:1:Voie Log D01:1
mercredi 23 janvier 2013 02:13:27,672 Digital channel rising edge D01:1:Voie Log D01:1
mercredi 23 janvier 2013 02:33:15,400 Digital channel rising edge D01:1:Voie Log D01:1
mercredi 23 janvier 2013 02:53:03,151 Digital channel rising edge D01:1:Voie Log D01:1
mercredi 23 janvier 2013 03:12:50,910 Digital channel rising edge D01:1:Voie Log D01:1
mercredi 23 janvier 2013 03:32:38,694 Digital channel rising edge D01:1:Voie Log D01:1
mercredi 23 janvier 2013 03:52:26,505 Digital channel rising edge D01:1:Voie Log D01:1
mercredi 23 janvier 2013 04:12:14,335 Digital channel rising edge D01:1:Voie Log D01:1
mercredi 23 janvier 2013 04:32:02,173 Digital channel rising edge D01:1:Voie Log D01:1
mercredi 23 janvier 2013 04:51:50,043 Digital channel rising edge D01:1:Voie Log D01:1
mercredi 23 janvier 2013 05:11:37,935 Digital channel rising edge D01:1:Voie Log D01:1
mercredi 23 janvier 2013 05:31:25,826 Digital channel rising edge D01:1:Voie Log D01:1
mercredi 23 janvier 2013 05:51:13,695 Digital channel rising edge D01:1:Voie Log D01:1
mercredi 23 janvier 2013 06:11:01,516 Digital channel rising edge D01:1:Voie Log D01:1
mercredi 23 janvier 2013 06:30:49,281 Digital channel rising edge D01:1:Voie Log D01:1
mercredi 23 janvier 2013 06:50:36,937 Digital channel rising edge D01:1:Voie Log D01:1

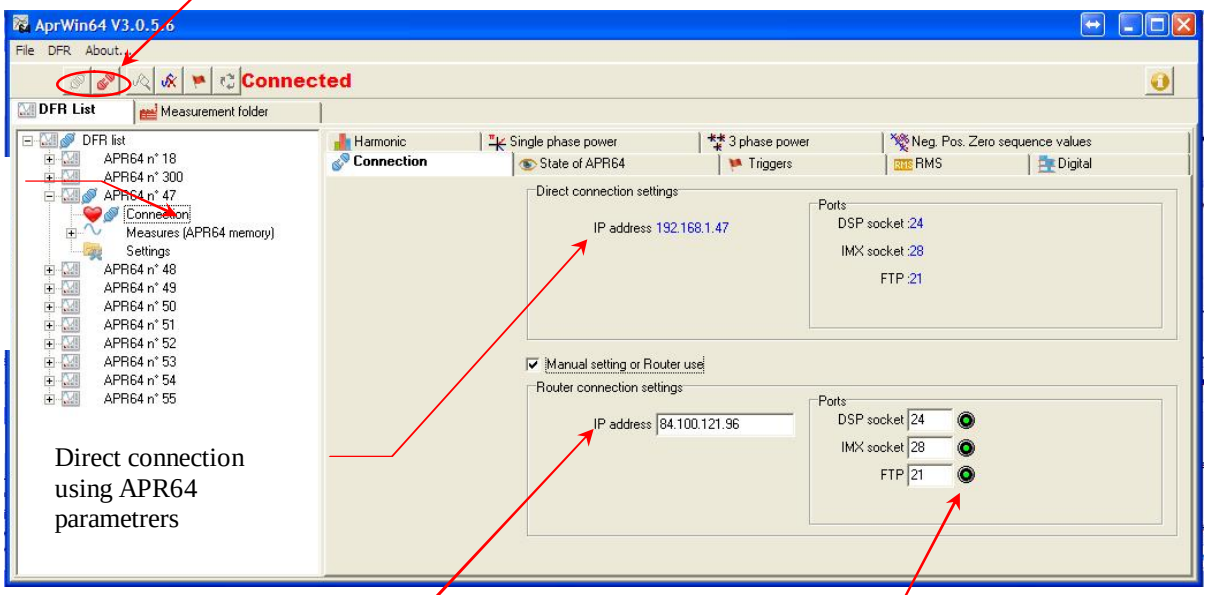
The synchronization of the different files when a folder is composed of more than one unit is done automatically by APRWIN64 Software.

Note : Each import module (APR16,COMTRADE …) is licenced (Option)

Connection to APR64

The link between the APR64 and the PC is done by Ethernet (TCP-IP)

To connect, choose the unit and then click on the connection icon.



Note : In case of using a router, indicate the external address (internet address) and the port configured in the router (to access to internal address).
84.10.121.96 / port 24 extern is equivalent to internal address 192.168.1.47 / port 24
….

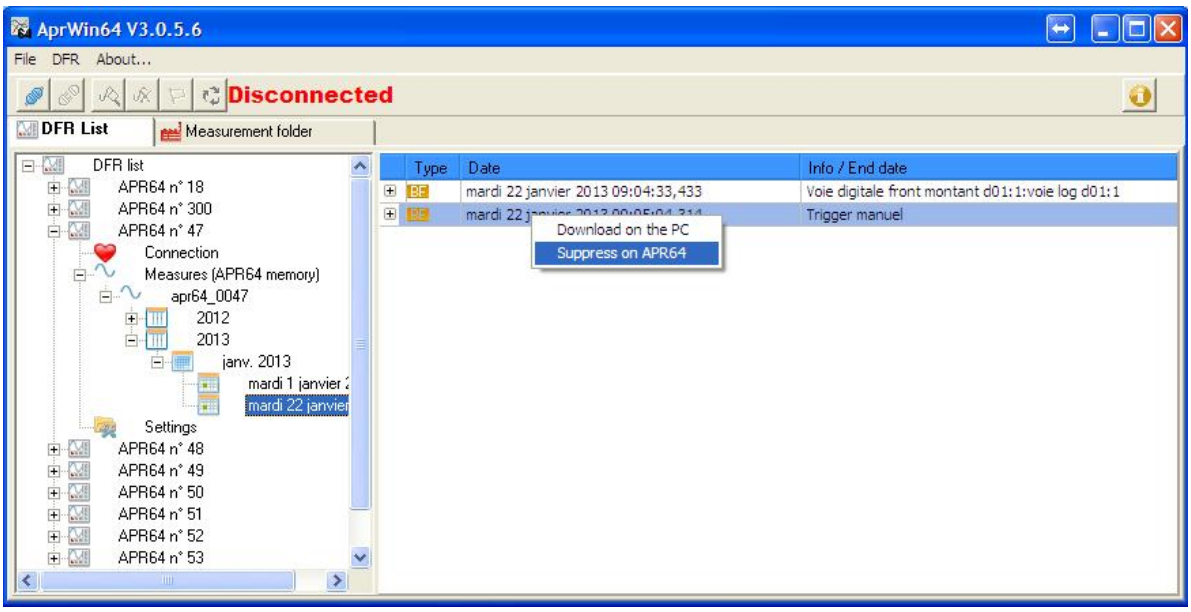
As soon as the link is ok, the PC can :

- Import the measurements from APR64
- Erase the measurements in APR64
- Parametrer the APR64
- Display measurements in realtime
- Manual trig the APR64
- Read and setup the time

Import / Erase measurements

In order to import/erase measurements stored on the APR64, you need to connect to the unit and then choose measures (APR64 memory) folder. Choose the year, month and day and then choose the files(s) to be imported/erased and right click

Note : At the beginning of the connection, the APRWIN64 software updates the Folder "Measures". It can take some time depending of the speed of the connection.



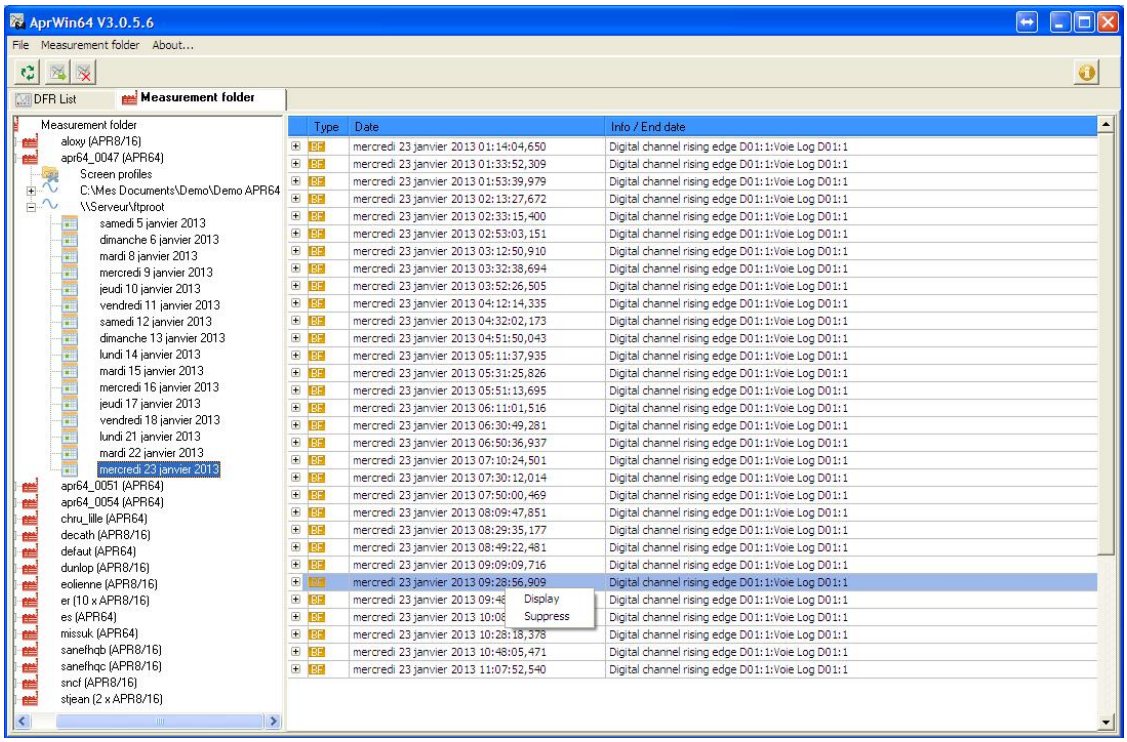
When the files have been choosen, the measures are stored in the default place on the PC defined in the configuration menu.

Analyzing data on the PC

APRWIN64 Software allows to analyze measurements files from APR64, APR16, APR8, APR4U4I, APRV, ELODI and COMTRADE files

Display module can show DFR or Trend mode event. It allows to display simultaneously many files at the same time.

Choose one or more files in the folder and right click to view the measurements (Or double click on one file)



Quick Start

In order to start an APR64 you need :

- Create an "APR64" in the "unit" manager using informations given by DFV (serial #, user name, key).
- Create un local parameter on the PC
- Connect the measurements on the APR64

- **For the first use :**
  - Copy the parameter file on the USB key
  - Connect the USB key to the APR64

- Power on the APR64 and let it upgrade with the usb key.
- Connect APR64 with Ethernet
- Export parameters from the PC to the APR64 le paramétrage vers l'APR64 (If not done by USB key)
- Verify in the real time menu that all measures are correct no trigger is active
- Start the trigger ("Enable trigger" button)

To get the measures done by APR64 :

- Connect to the APR64 (Ethernet)
- In the unit manager open the folder "measure (APR64 memory)"
- Select one or more file to be imported
- Right click "import on PC"
- Measurements will be imported on the place defined as default in the setup menu.

Triggers et recording

DFR or Trend mode

The APR64 can be programmed to record event when a threshold is reached (under, over, relative) for an analog (RMS, Power …) or a digital channel.

The record can be programmed on the begin of the fault and/or the end the fault. (Normal to fault state / Fault to normal state)

For each record, the DFR records a pre-time and a post-time.

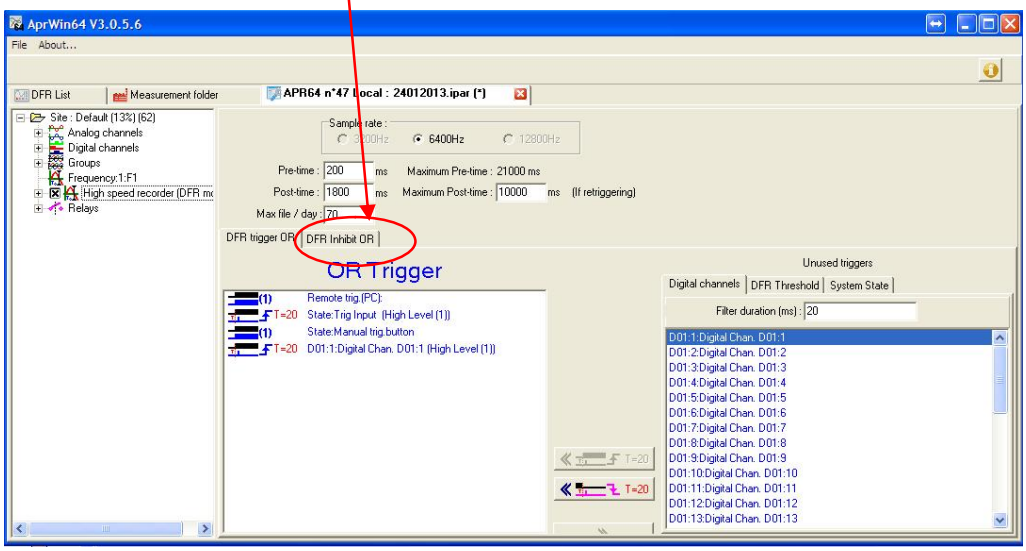
The recording duration can also be expanded if a new event occurs during the post-time (retriggering).

In order to avoid to saturate the APR64, the duration is limited by the maximum post-time duration.

Events can be filtered, and the DFR can be inhibited if the duration of the event is too short.

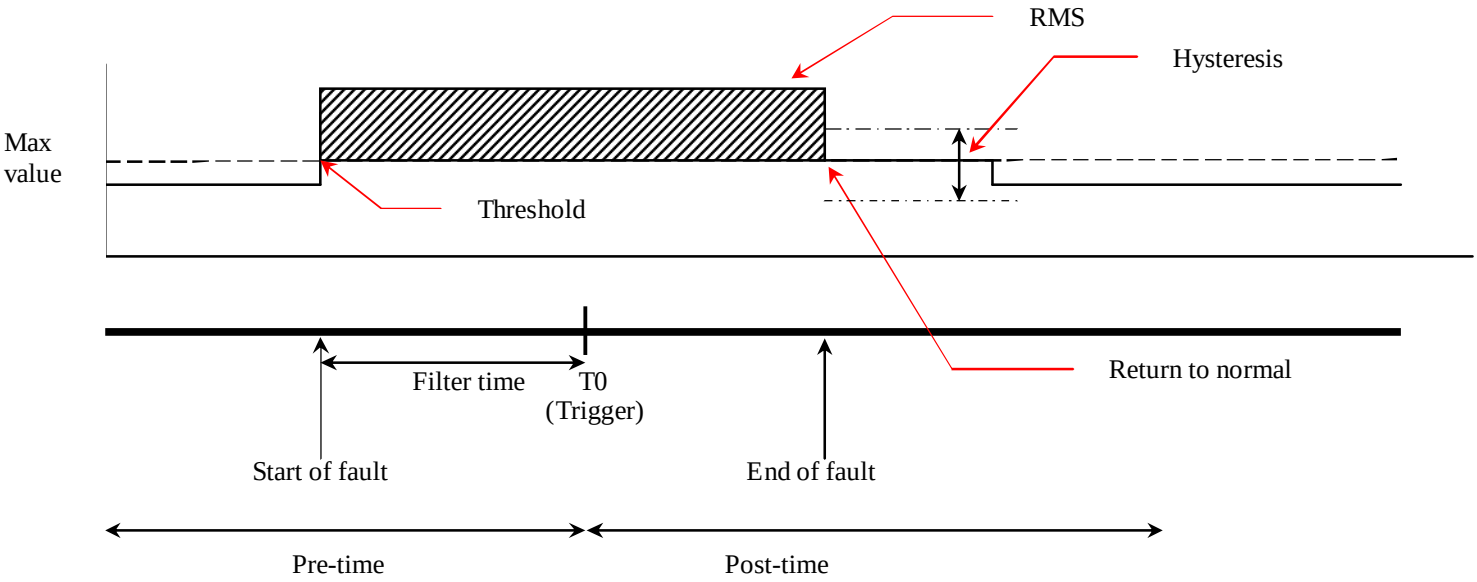
Another security can be programmed on the DFR. The recording can be inhibited if the time between the end of an event and the following one is too short (interval before retriggering).

Recording can be inhibited by a OR condition (Maintenance position programmed on a digital channel for example)



Example of a programming for the DFR mode

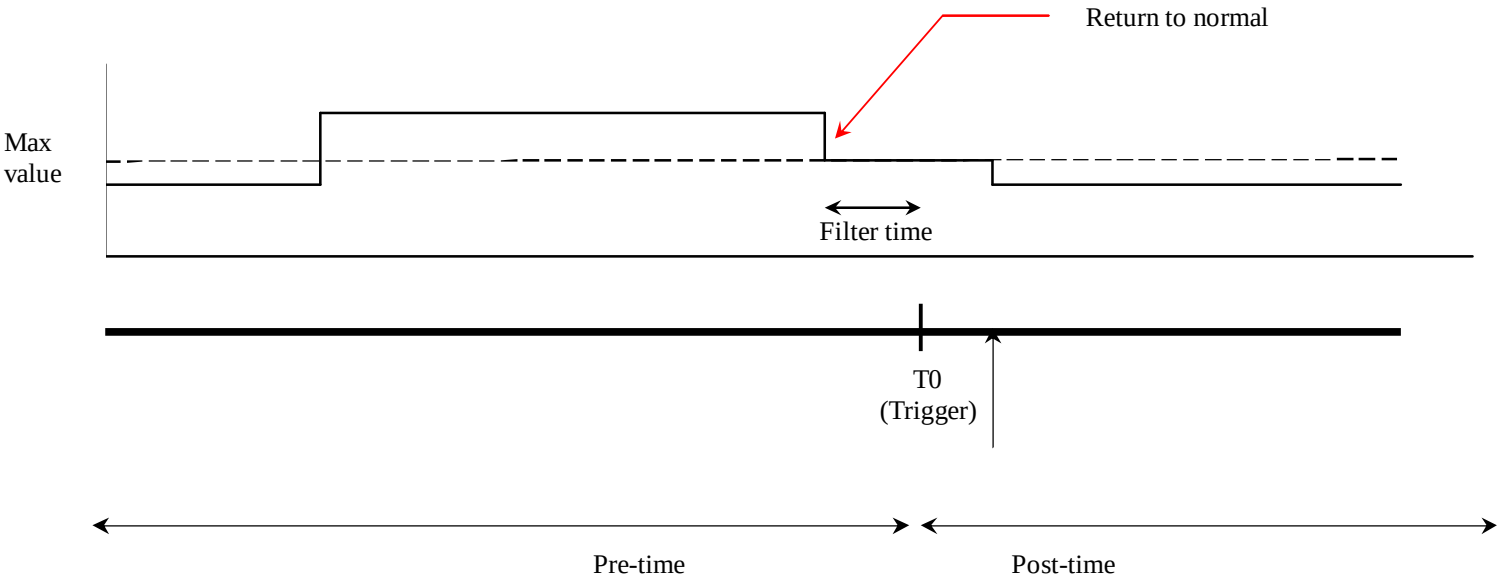
1) Threshold on reaching



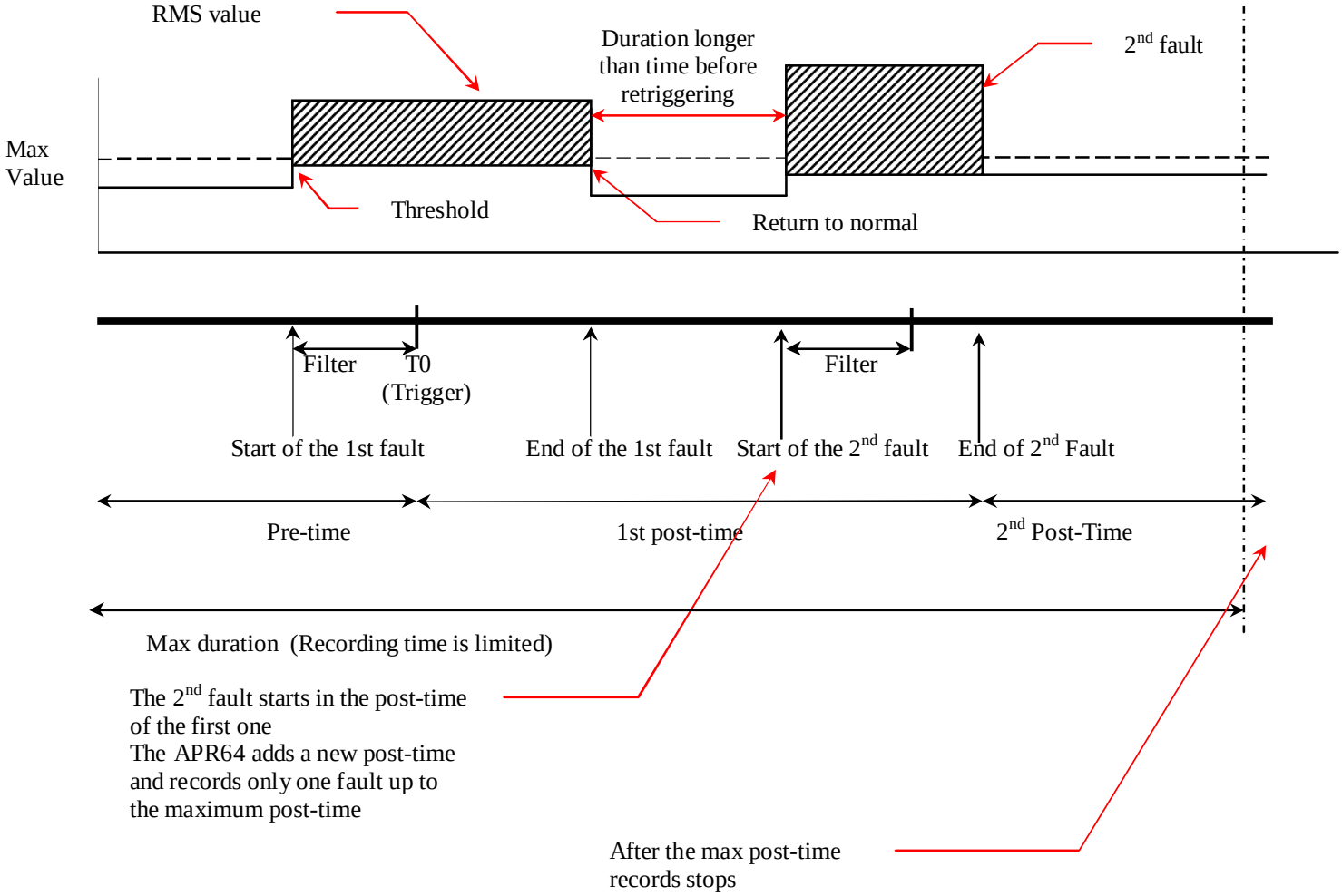
In this case, a max threshold is reached, the APR64 detects this threshold immediately but do not trig immediatly. In order to trig, the event must be longer that the filter time

If the event if longer than the filter, then the pre-time is set and the recording starts up to the post-time.

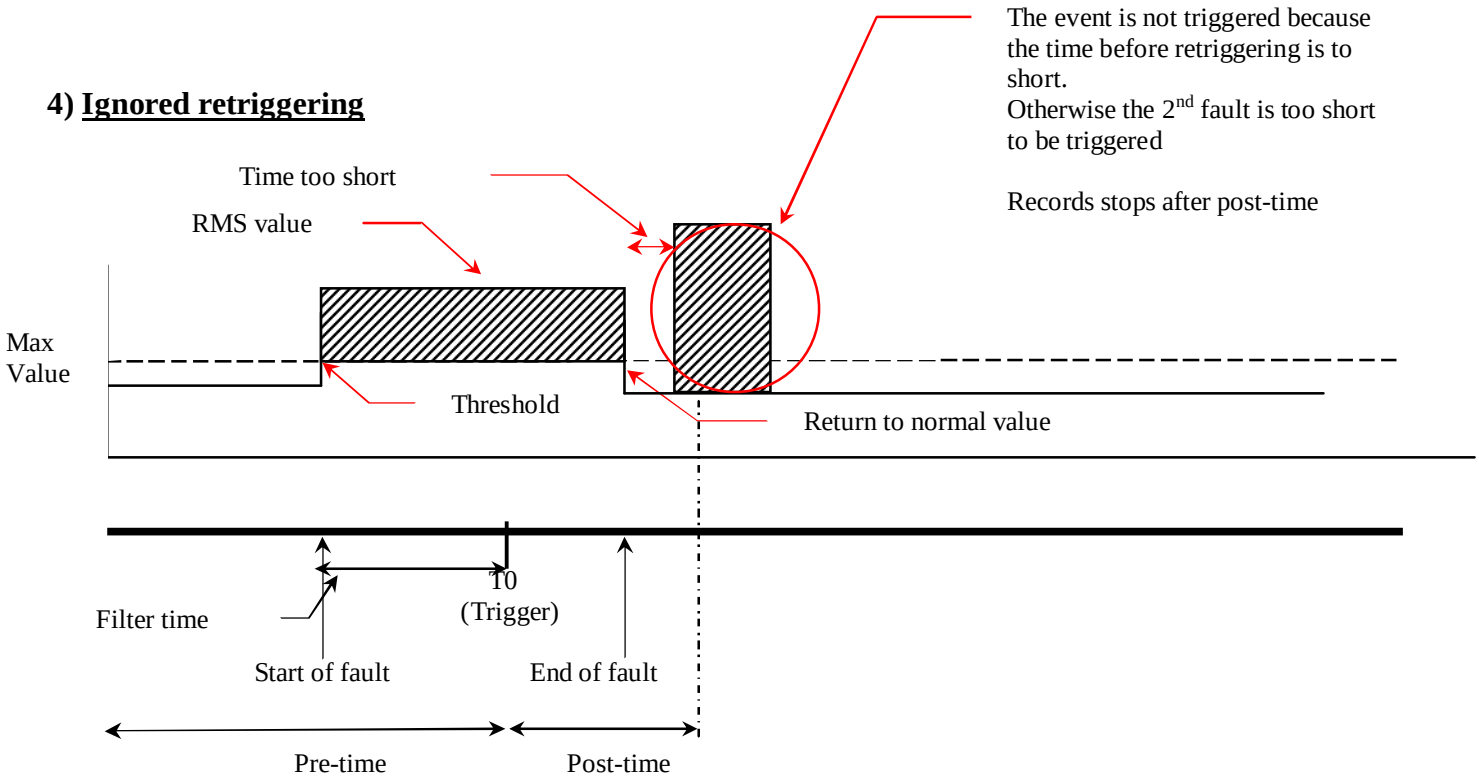
2) Threshold on return



3) Cycle with retriggering limited by the max. post-time

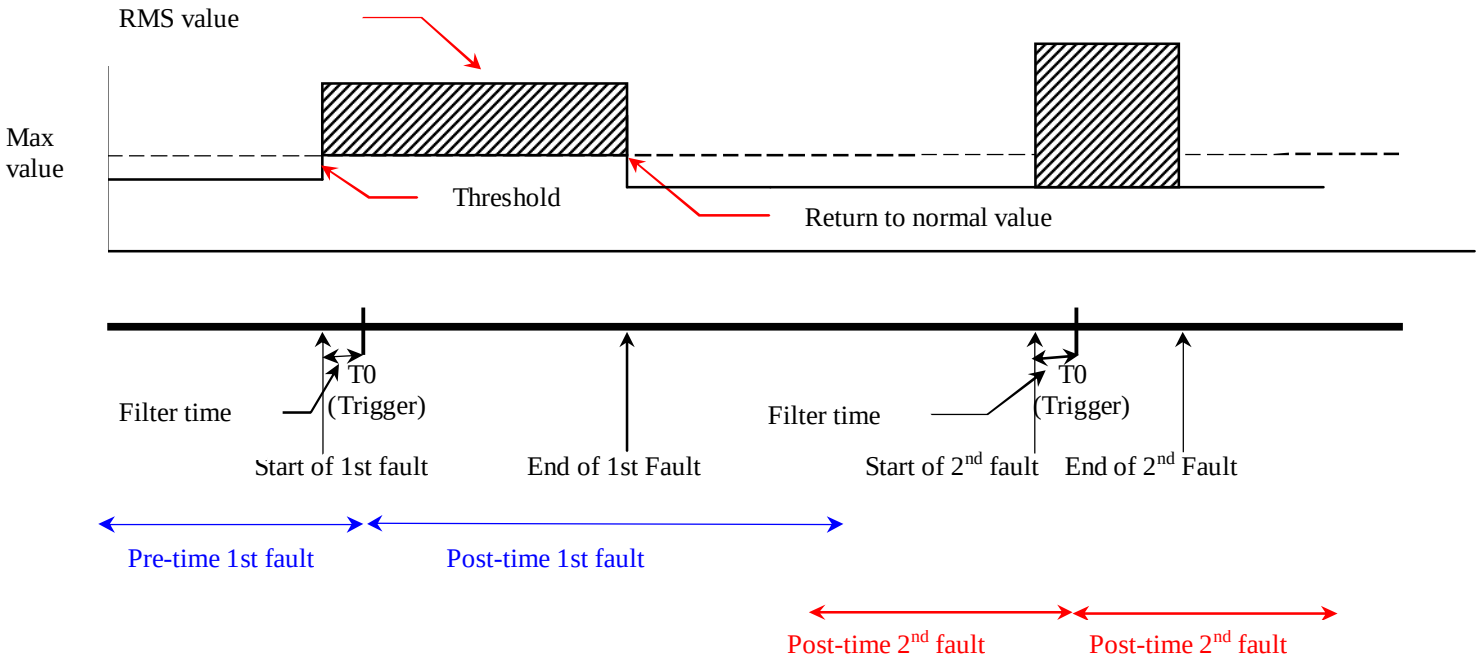

RMS value
Duration longer than time before retriggering
2nd fault
Max Value
Threshold
Return to normal
Filter
T0 (Trigger)
Filter
Start of the 1st fault
End of the 1st fault
Start of the 2nd fault
End of 2nd Fault
Pre-time
1st post-time
2nd Post-Time
Max duration (Recording time is limited)
The 2nd fault starts in the post-time of the first one
The APR64 adds a new post-time and records only one fault up to the maximum post-time
After the max post-time records stops

4) Ignored retriggering



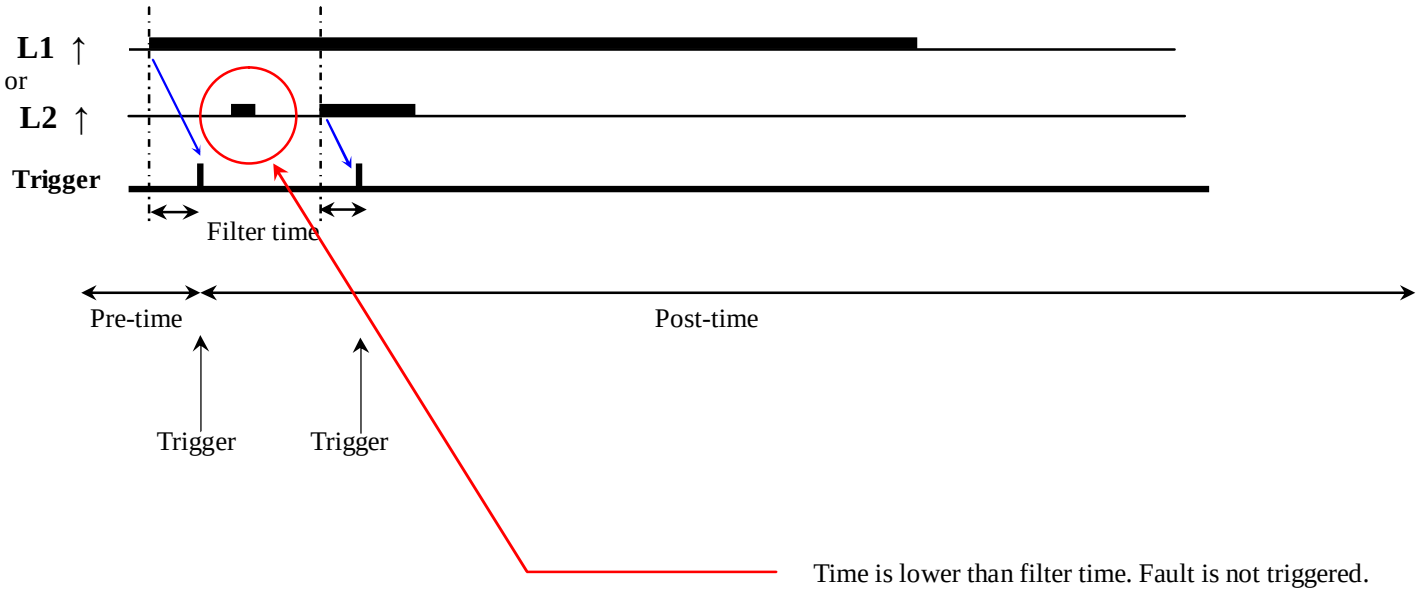
In this case the time befrore retriggering is not complied

5) 2 different faults



In this case the pre-time of the second fault is common with some time of the 1st fault

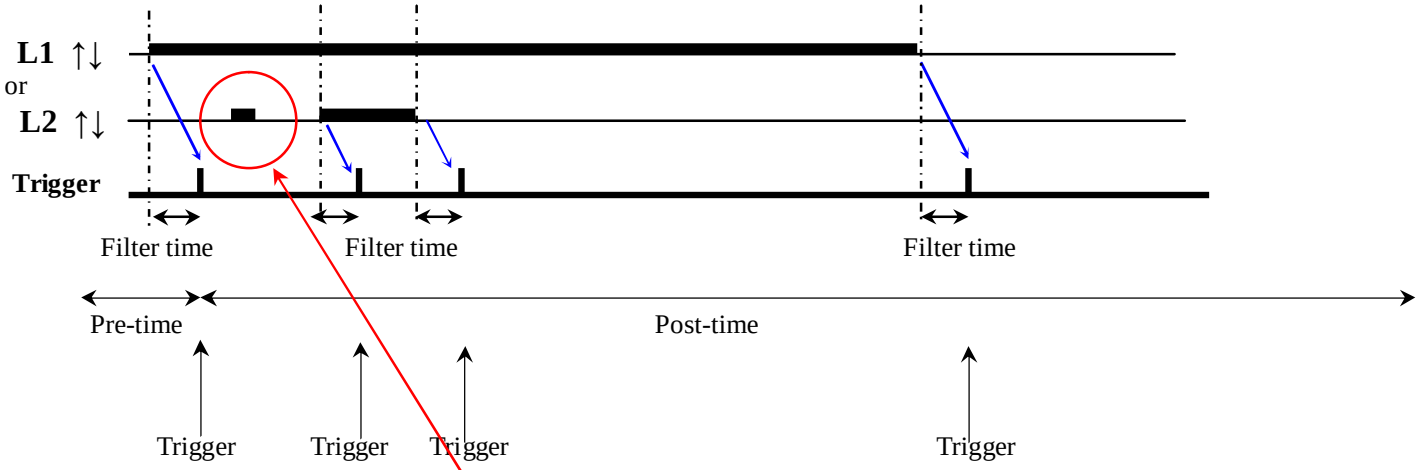
6) Trigger on digital channels (low to high)



Time is lower than filter time. Fault is not triggered.

Filter-time allows to eliminate bad triggers.

7) Trigger on digital channels (low to high and high to low)



Time lower than filter time **à** No record .

.

Post-time is postpone as soon as the triggers are present up to maximum post-time

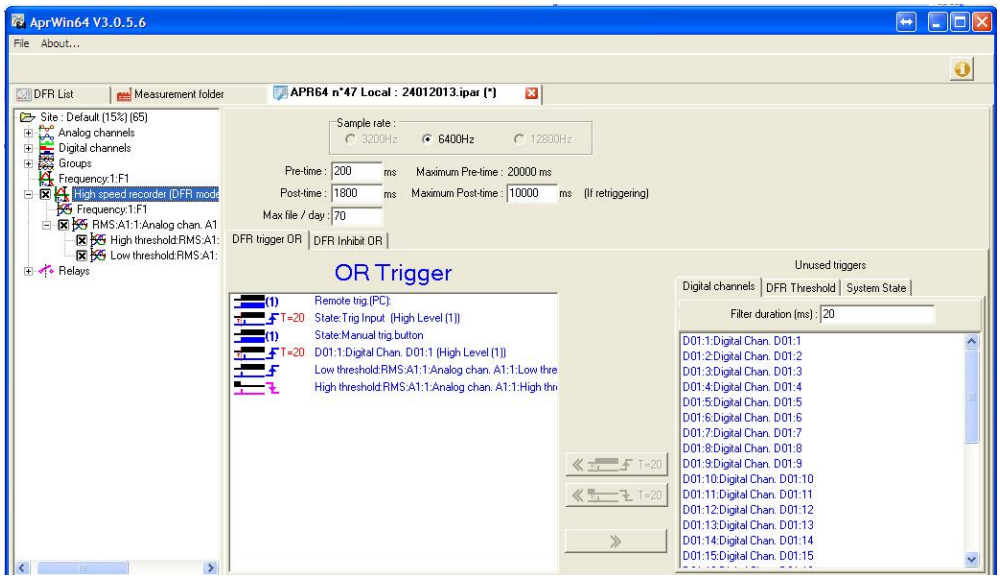
DFR Mode

In the DFR Mode the sampling rate is 6400Hz or 12,8kHz (6400Hz with the BFOP2)

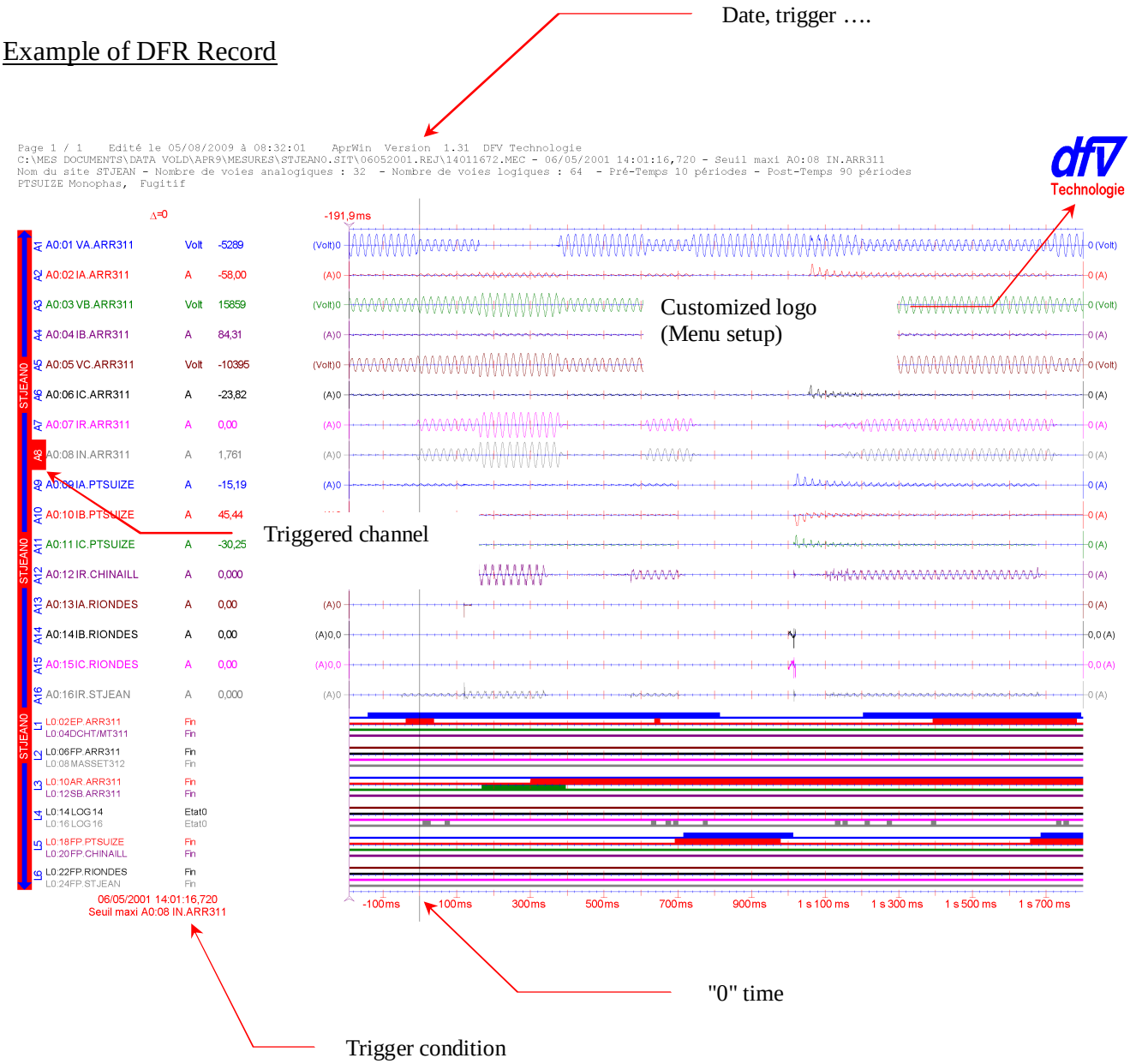
The DFR can trigger on min, max, dx/dt threshold and on digital conditions AND , OR , on the start or return of the threshold.

The DFR recorder can be triggered by the Trend mode recorder

The number of record for one day can be limited (70 by default)



Example of DFR Record


Date, trigger ….
Page 1 / 1 Edité le 05/08/2009 à 08:32:01 AprWin Version 1.31 DFV Technologie
C:\MES DOCUMENTS\DATA VOLD\APR9\MESURES\STJEAN0.STT\06052001.REJ\14011672.MEC - 06/05/2001 14:01:16,720 - Seuil maxi A0:08 IN.ARR311
Nom du site STJEAN - Nombre de voies analogiques : 32 - Nombre de voies logiques : 64 - Pré-Temps 10 périodes - Post-Temps 90 périodes
PTSUIZE Monophas, Fugitif
dfv Technologie
Customized logo
(Menu setup)
Triggered channel
-191,9ms
A0:01 VA.ARR311 Volt -5289
A0:02 IA.ARR311 A -58,00
A0:03 VB.ARR311 Volt 15859
A0:04 IB.ARR311 A 84,31
A0:05 VC.ARR311 Volt -10395
A0:06 IC.ARR311 A -23,82
A0:07 IR.ARR311 A 0,00
A0:08 IN.ARR311 A 1,761
A0:09 IA.PTSUIZE A -15,19
A0:10 IB.PTSUIZE A 45,44
A0:11 IC.PTSUIZE A -30,25
A0:12 IR.CHINAILL A 0,000
A0:13 IA.RIONDES A 0,00
A0:14 IB.RIONDES A 0,00
A0:15 IC.RIONDES A 0,00
A0:16 IR.STJEAN A 0,000
L0:02 EP.ARR311 Fn
L0:04 DCHT/MT311 Fn
L0:06 FP.ARR311 Fn
L0:08 MASSET312 Fn
L0:10 AR.ARR311 Fn
L0:12 SB.ARR311 Fn
L0:14 LOG14 Etat0
L0:16 LOG16 Etat0
L0:18 FP.PTSUIZE Fn
L0:20 FP.CHINAILL Fn
L0:22 FP.RIONDES Fn
L0:24 FP.STJEAN Fn
06/05/2001 14:01:16,720
Seuil maxi A0:08 IN.ARR311
-100ms 100ms 300ms 500ms 700ms 900ms 1 s 100 ms 1 s 300 ms 1 s 500 ms 1 s 700 ms
"0" time
Trigger condition

Programming the APR64

The APR64 is configured by a "param" file. This file is stored on the APR64.

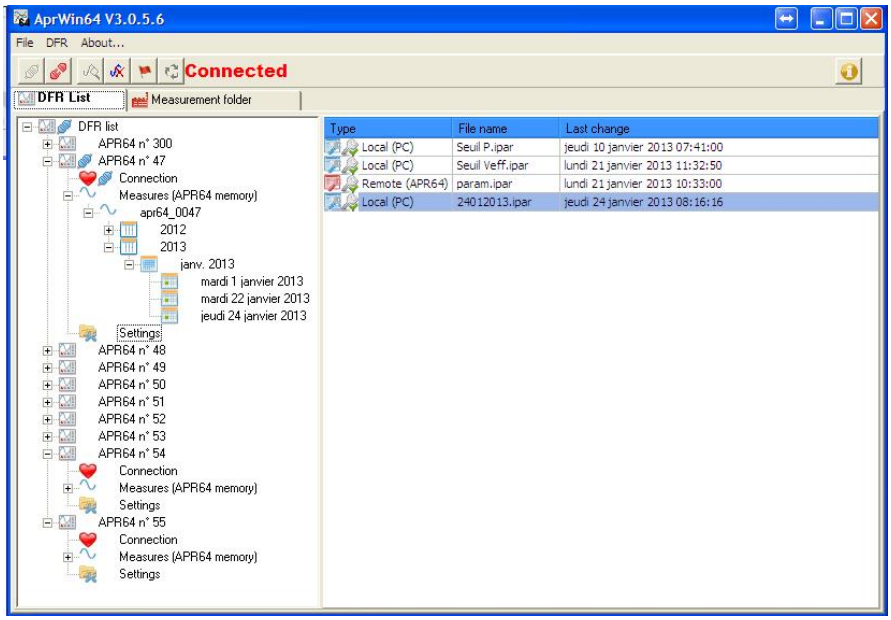
The parametrers of the APR64 is composed of many parts :

- Parametrers of the analog channels
- Parameters of the digital channels
- Creating of group of channels (triphase or single phase system)
- Frequency reference

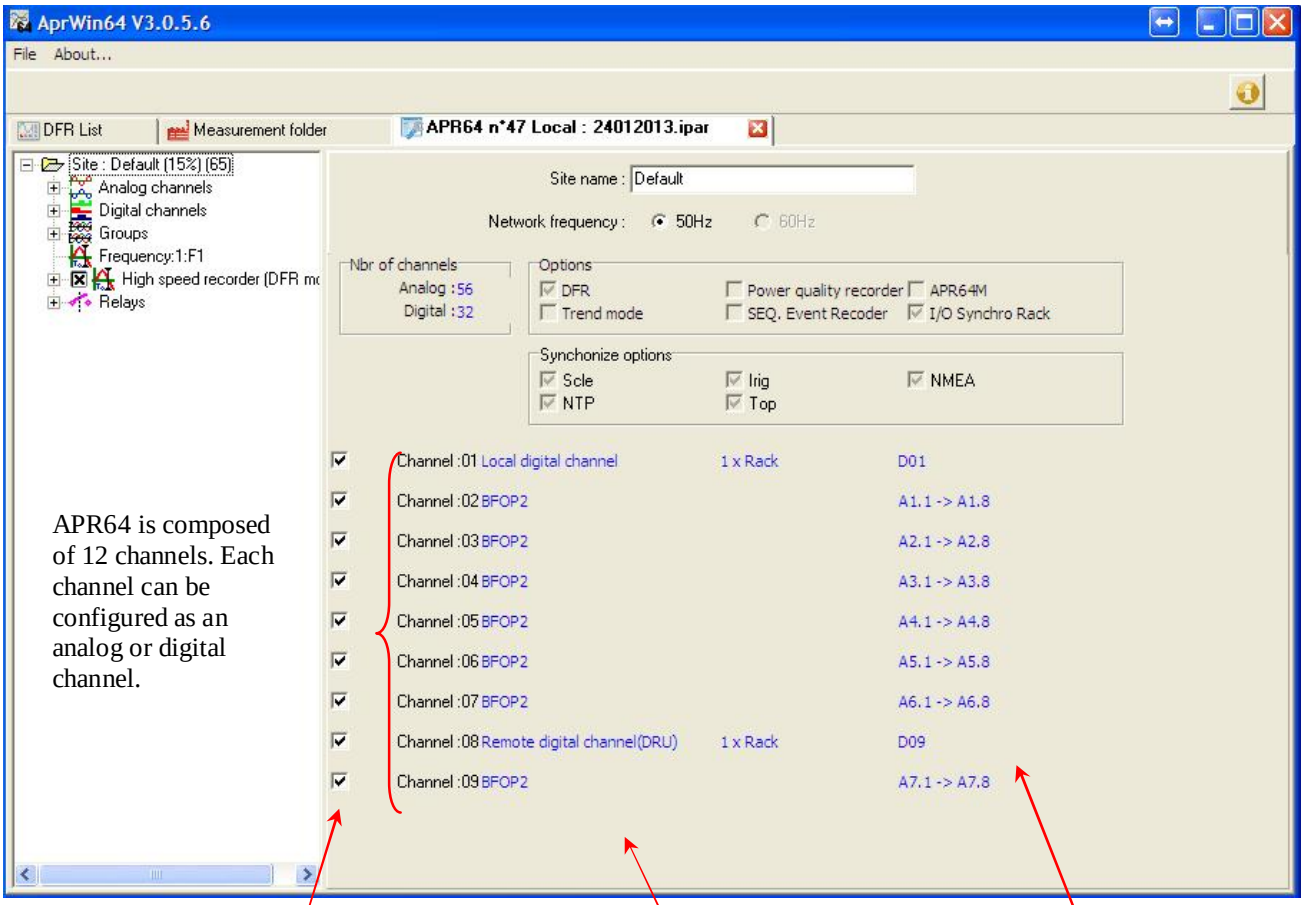
For the DFR (Option)
- Creating of analog channels to be measured
- Creating of calculated analog channels (Power, Frequency…)
- Threshold on analog values (measured of calculated)
- Trigger on digital channels
- OR and AND formulas

For each recorder (Option)
- Creating of analog channels to be measured
- Creating of calculated analog channels (Power, Frequency, Harmonics…)
- Threshold on analog values (measured of calculated)

The parameter of the APR64 is done on a PC with APRWIN64 software installed. Then it is sended to the APR64 with Ethernet link or in an USB key (obligatory the first time)



The following screen allows to define the global parameters.



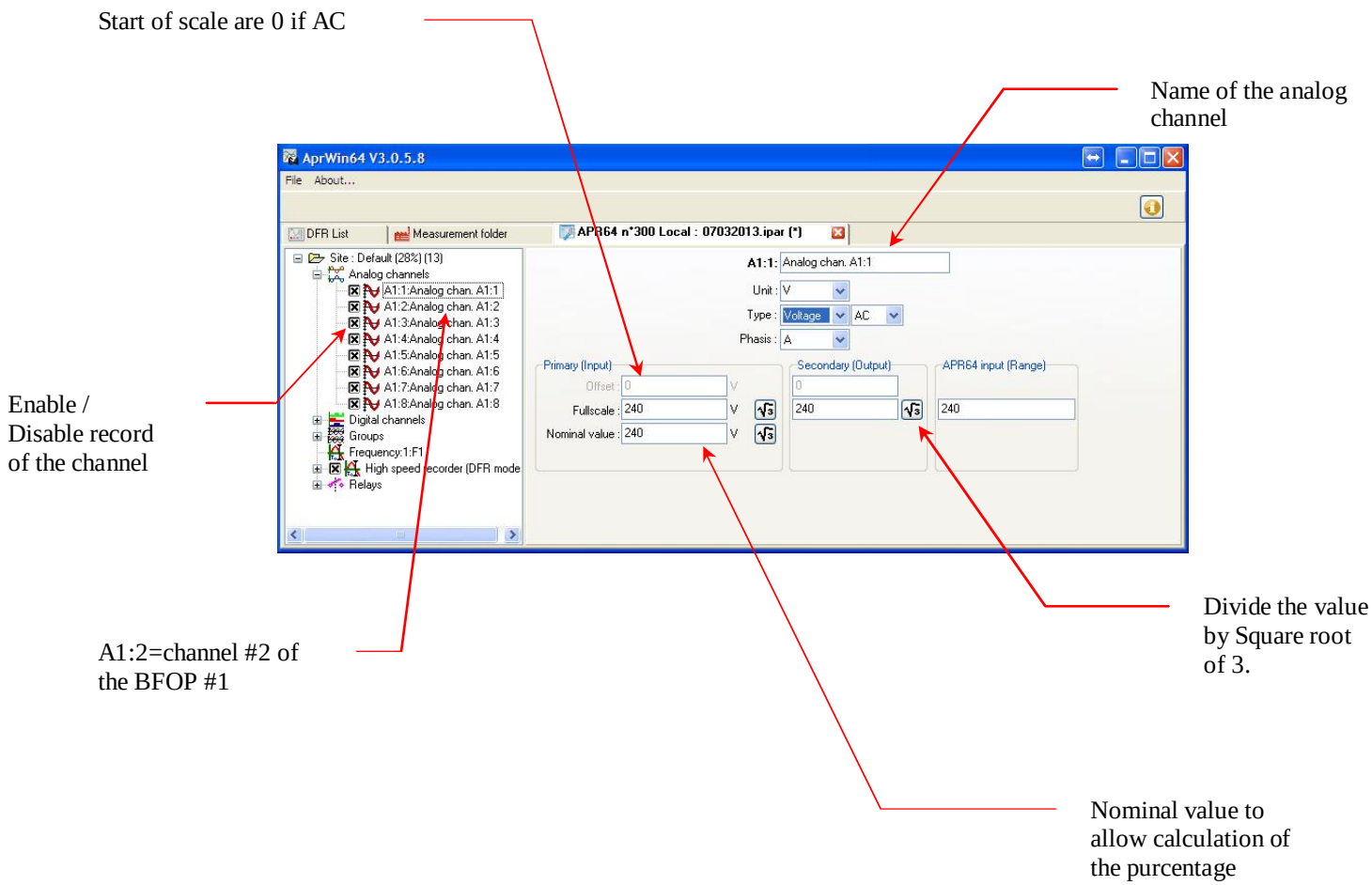
- site name (folder name)
- Mains frequency (50 or 60Hz)

Working range of APR64 is 42,5Hz to 57,5Hz in 50Hz and 51Hz to 69Hz in 60Hz. If frequency is over these limits, frequency is invalid and setted to the default value (50Hz or 60Hz).

Analog channels programming

Each analog channel of the APR64 is defined by :

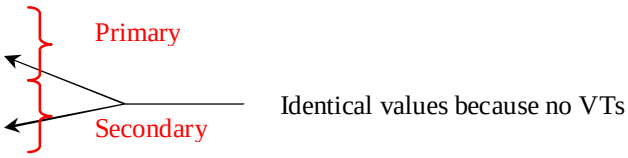
- Name of the channel (on 19 characters)
- Type of channel (Voltage, current, other) AC or DC
- Phasis (A,B,C,N, Other)
- Unit (Volt, kV, A, ° , bar ….)
- Nominal value (=100%)
- Start of scale (Measured value) or VTs/CTs primary
- End of scale (Measured value) or VTs/CTs primary
- Start of scale (Value on input of APR64) or VTs/CTs secondary
- End of scale (Value on input of APR64) ou VTs/CTs secondary
- Input range used on the unit
  20A to measure 4In of a 5A signal
  240V for a voltage channel of the BFOP2



Exemples of programming :

1) Measure of a 230V voltage with BFOP2

Channel name : mains voltage
Type of channel : Voltage AC
Phasis : A
Unit : Volt
Nominal value : 230V
Start of value scale : 0V
End of value scale : 230V
Start of input scale : 0V
End of input scale : 230V
Range: 240V (End of scale of BFOP2)



2) Measure of a single voltage on 20000V with Vts 20000V / 100V with BFOP2

Name of channel : VA.TR422
Type of channel : Voltage AC
Phasis : A
Unit : Volt
Nominal value : 11547V (20000/ √3)
Start of value scale : 0V
End of value scale : 11547V (Input of the Vts)
Start of input scale : 0V
End of input scale : 57,7V (100 / √3) (Output of the Vts)
Range : 240V (End of scale of BFOP2)

3) Measure of a current on a CTs 4000 /5A with a BFOP2

Name of channel : IA.TR422
Type de channel : Current AC
Phasis : A
Unit : A
Nominal value : 1000A
Start of value scale: 0A
End of value scale: 4000A (input value of the CTs)
Start of input scale :: 0A
End of input scale :: 5A (output value of the CTs)
Range : 20A (End of scale of BFOP2)

PS : If the 20A range is choosen, The APR64 will be able to measure a current up to 20A (4x5A) on the CTs secundary 16000A (4x 4000) on primary.

4) Measure of a temperature (Probe 0-60° to 4/20mA) with a BFOP2

Name of channel : Transformer Temp.
Type of channel : Other DC
Phasis : Autre
Unit : °C
Nominal value : 30°C
Start of value scale : 0°C
End of value scale : 60°C
Start of input scale : 4mA
End of input scale : 20mA
Range : 20mA (End of scale of BFOP2)

BFOP is equipped with a 4-20mA input

5) Measure of a composed voltage on a 400kV mains with VTs 400kV / 100V with a BFOP2

Name of channel : UC.TR3
Type of channel : Voltage AC
Phasis : C
Unit : kV
Nominal value: 400kV (100%)
Start of value scale : 0kV
End of value scale: 400kV
Start of input scale : 0V
End of input scale : 100V
Range : 240V (End of scale of BFOP2)

Vts 400kV to 100V

6) Measure of a 48V DC battery with BFOP2

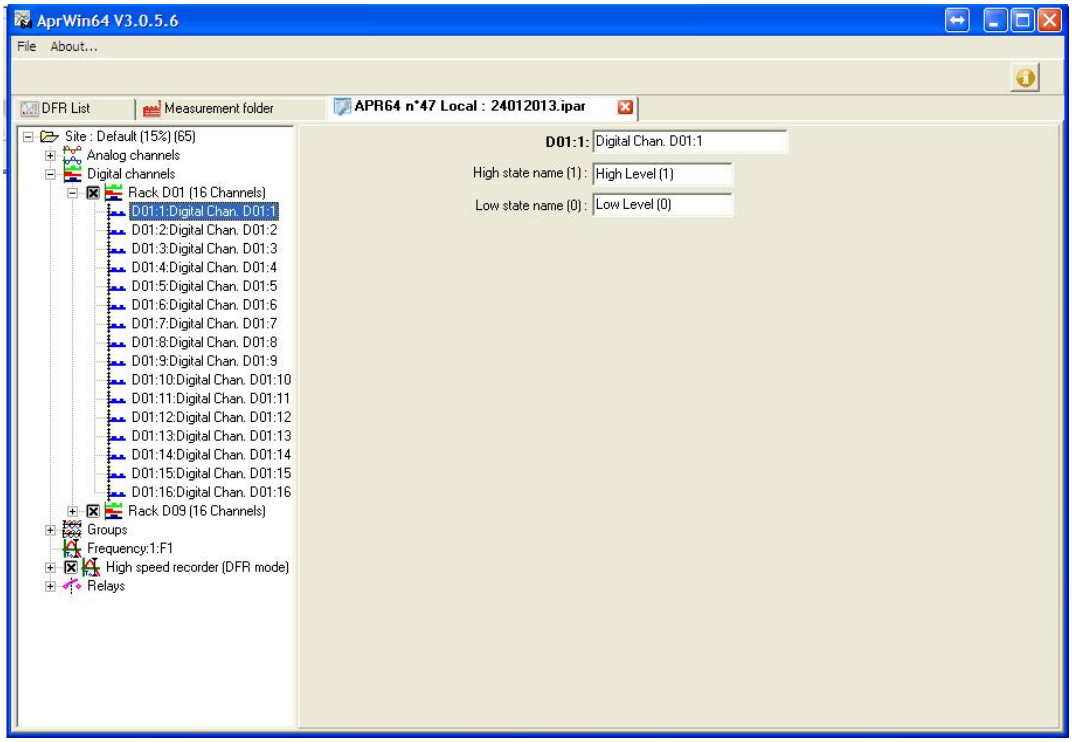
Channel name : U Batterie
Type of channel : Voltage DC
Phasis : Other
Unit : V
Nominal value : 48V (100%)
Start of value scale : 0V
End of value scale : 48V
Start of input scale : 0V
End of input scale : 48V
Range : 240V (End of scale of BFOP2)

Pirmary=Secundary

Parameter of the digital channels

Each digital channel of the APR64 is defined with these informations :

Name of the channel (19 char)
Name of the high state (1) (19 char)
Name of the low state (0) (19 char)



The digital channels are coded like that :

D01:01 (Digital channel 1 of the rack D01)

D05:03 (Digital channel 3 of the rack D05)

Note : Each channel (among the 12) can be equipped with 8 digital rack
Even if the racks are not configured, the numbering is done in order a rack can be added after.

Example : APR64 equipped with 4 digital racks and 1 DRU equipped with 7 racks

D01:L1-L16
D02:L1-L16
D03:L1-L16
D04:L1-L16
D05-D08 missing

} Local racks

D09:L1-L16
D10:L1-L16
D11:L1-L16
D12:L1-L16
D13:L1-L16
D14:L1-L16
D15:L1-L16
D16: missing

} Remote racks (DRU)

Channels groups (single, bi, and triphase)

A group is defined with the following parametrers :

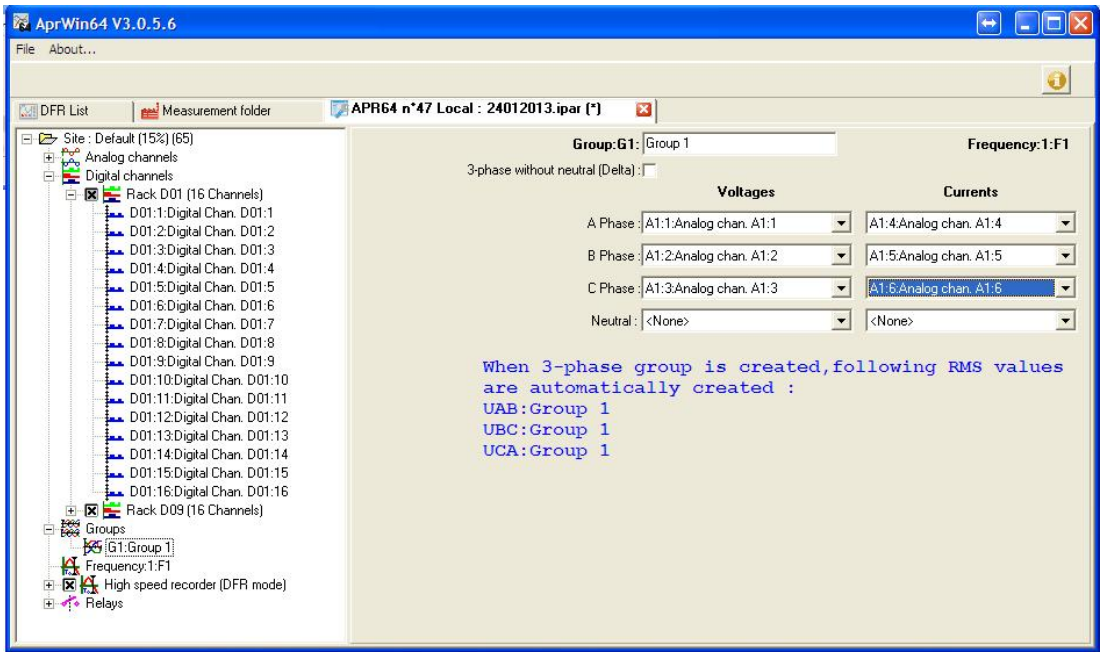
Name of the group (19 char)
Type of connection : Star (with neutral)
Triangle (without neutral)

Voltage channels Phasis A, Phasis B, Phasis C
Current channels Phasis A, Phasis B, Phasis C

Voltage neutral
Current neutral

For the Star mode
(With Neutral)

PS : A group can be defined with only 1 or 2 phasis, APR64 will adapt the calculation depending of the channels available.

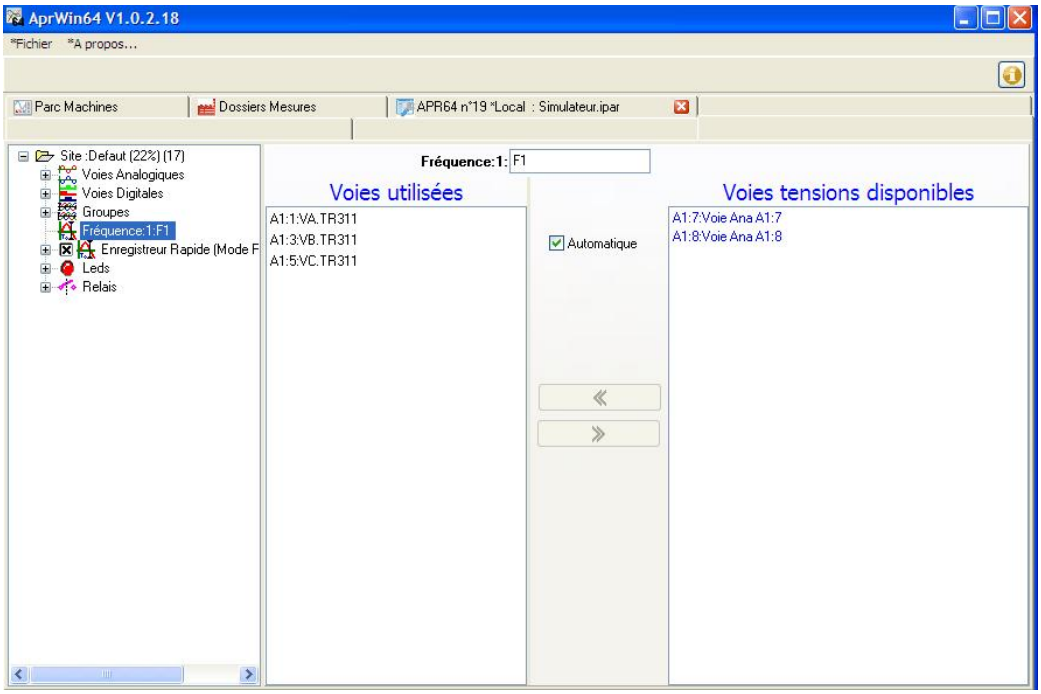


Ps : When creating groups "with neutral", APR64 will automatically create UAB, UBC et UCA values

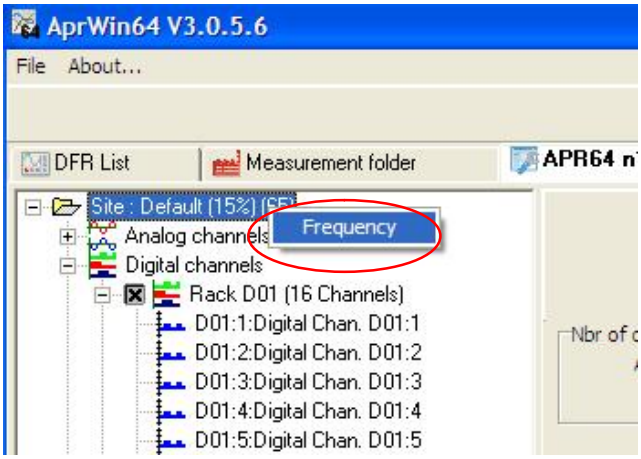
Example of groups : INCOMING1, OUTCOMING2, BUSBAR1

Frequency reference

In order to make a reliable measure, APR64 has to be synchronized on the mains frequency.
You have to define a list of voltage on which the frequency can be calculated.
If the frequency disappears on one channel, it is calculated on another one. If there is no valid frequency, the APR64 uses the frequency defined in the program.



If you need to measure more than one frequency, you can had one uses the following menu (Right click on "Site" menu.

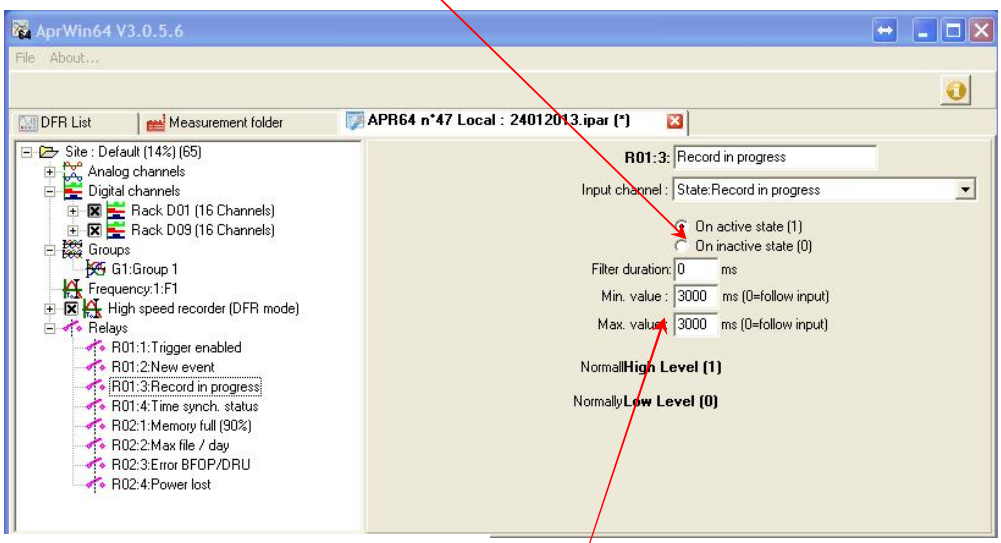


Relay outputs

APR64 can be equipped with 4, 8 or 12 relays .
APR64M is equipped with 2 relays.

Each relay output can be programmed with system information (measure active, record in progress…) or with threshold information (max threshold, digital channel …)

Signal must occurs more than "filter duration" to be triggered



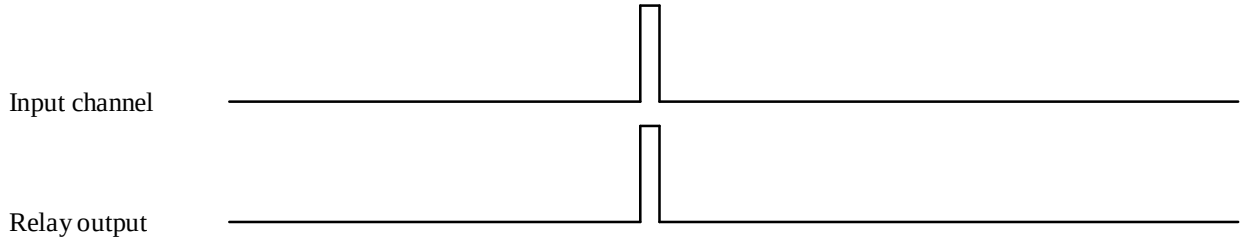
For every record, the relay goes to WORK STATE during "min value" and "Max value" if the input signals stays ON.

If the Min and Max value duration are 0, the relay output follows the input.

System signal can be "connected" to a relay output :

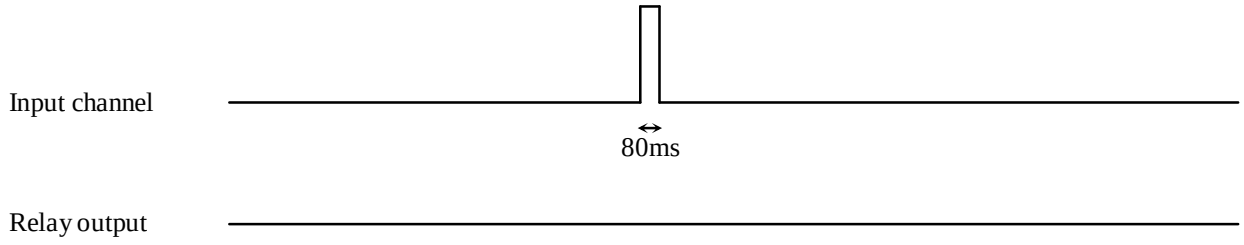
- Loss of external time synchronization
- Error on measurement module (BFOP or DRU) no power or bad fiber optic
- FTP Error (No connection with the server)
- Power lost (Operating on battery)
- Battery weak
- Measures started
- Record in progress
- Memory full 90%
- Memory full 95%
- New event
- Number of event reached for 24H

Example : Filter=0, Min duration=0, max duration=0



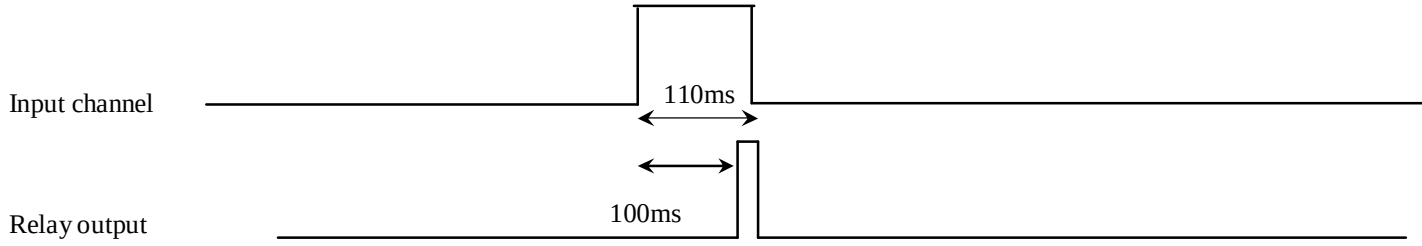
The relay output follows the input channel

Example : Filter=100ms, Min duration=0, max duration=0



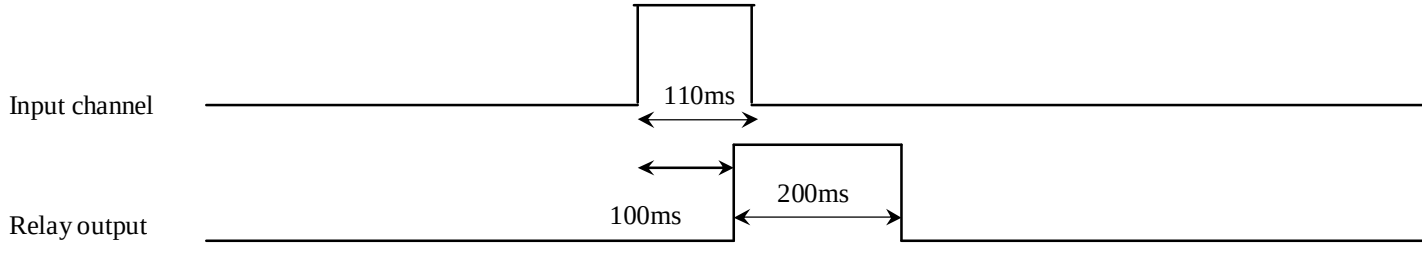
The duration of the input channel is too short (<100ms) , the input is filtered and the relay output don't change.

Example : Filter=100ms, Min duration=0, max duration=0



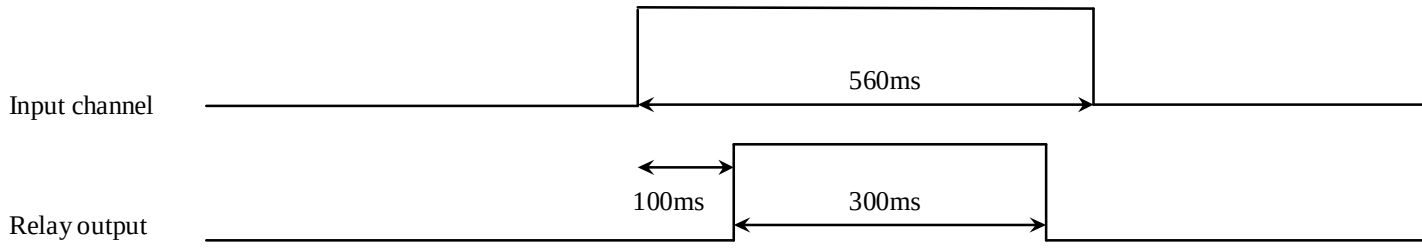
The relay output goes to High state after the filter of 100ms and then follows the input channel.

Example : Filter=100ms, Min duration=200ms, max duration=300ms



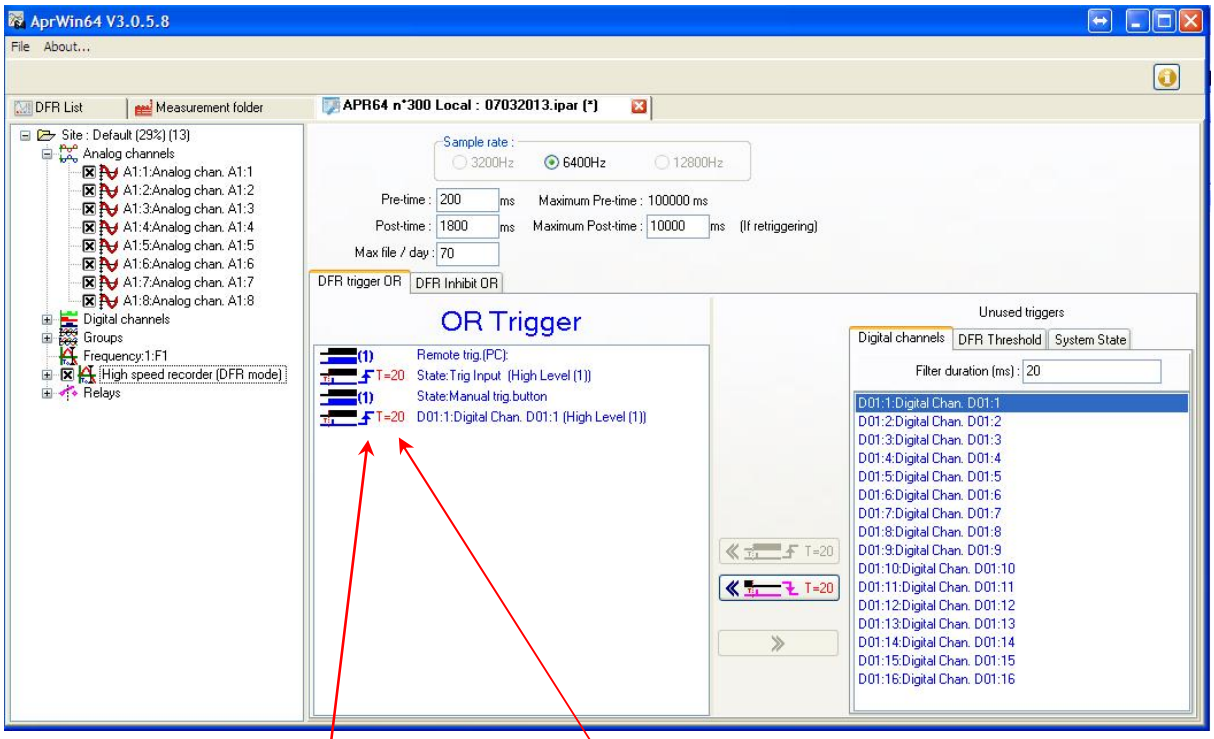
The relay goes high during 200ms after 100ms (Filter)

Example : Filter=100ms, Min duration=200ms, max duration=300ms



The relay output goes high during 300ms after 100ms. The high state is limited to 300ms.

Setup of DFR mode



State of the trigger (Low to High or high to low)

Filter duration

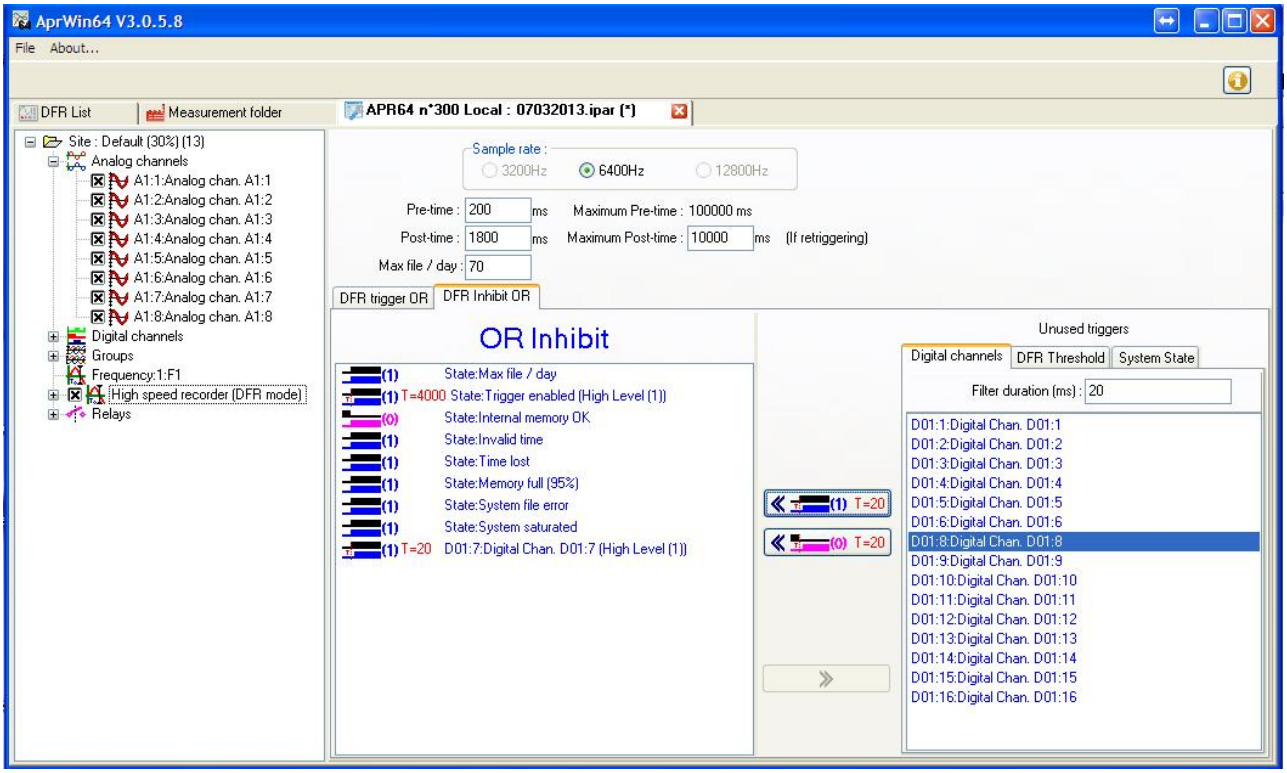
- Setup of the sampling frequency (Fixed to 6400Hz with the BFOP2)
- Setup of pre-time
- Setup of post-time
- Setup of maximum post-time
- Setup of the limit of file per day (counter reseted every day at 0H00)

DFR record is enabled if the "Trigger OR" function is true.

DFR inhibit if done by the "Inhibit OR"

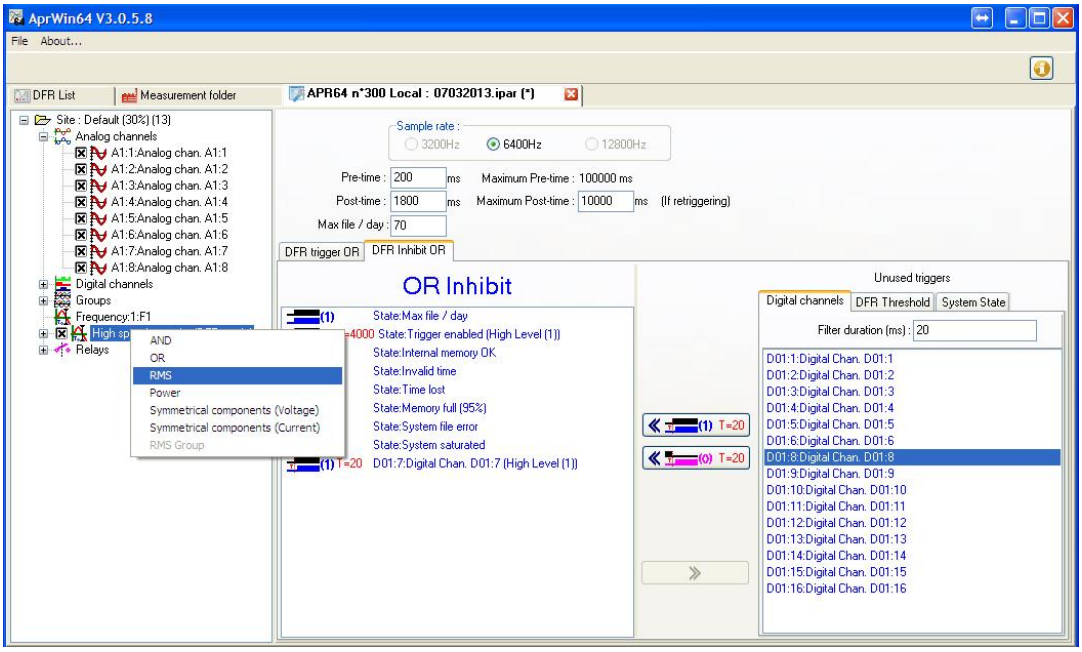
Caution : Filters take a lot of calculation time. Use them only if necessary.

Example of inhibit :



Creating calculated values

DFR can calculate some values from the measured signals.
These values are stored in the files generated by APR64 and can also be used to trig the DFR.



Calculated value available in DFR mode are :

- AND function
- OR function
- RMS value
- Frequency
- Power (active, reactive, apparent, cos, tg …)
- Symetrical components (Voltage and current)
- RMS values of the composed voltage (calculated with single voltages)

Setup of Threshold on analog or calculated channels.

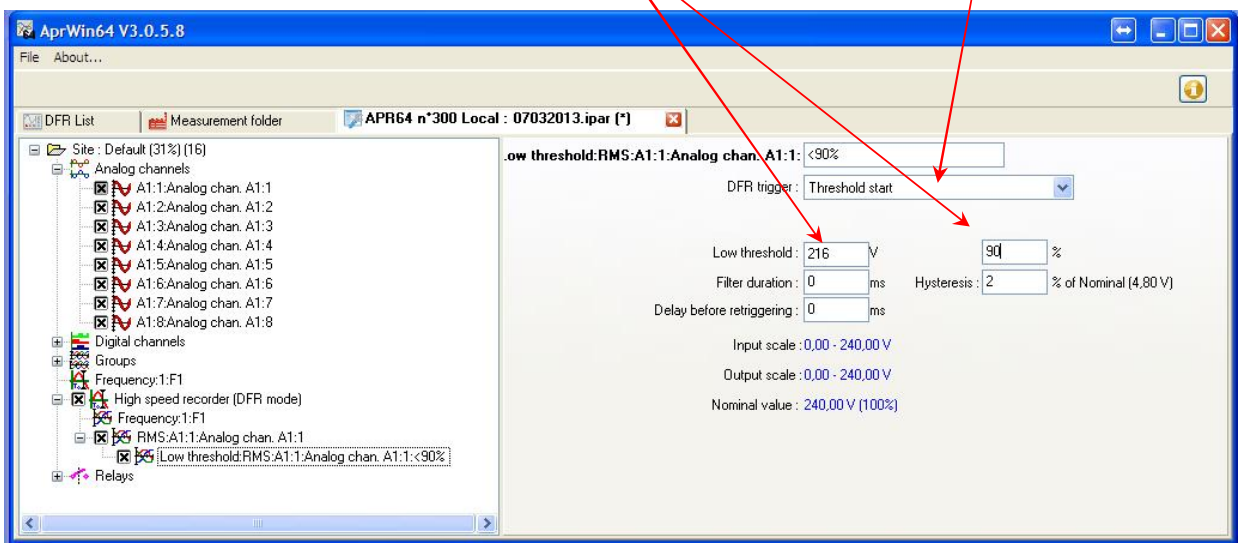
For each value it is possible to setup :

- Low threshold
- High threshold
- Relative threshold (dx/dt)

Trigger can be programmed low to high (normal state to fault state) or high to low (fault state to normal state)

Threshold in value or purcentage of the nominal

Name of threshold

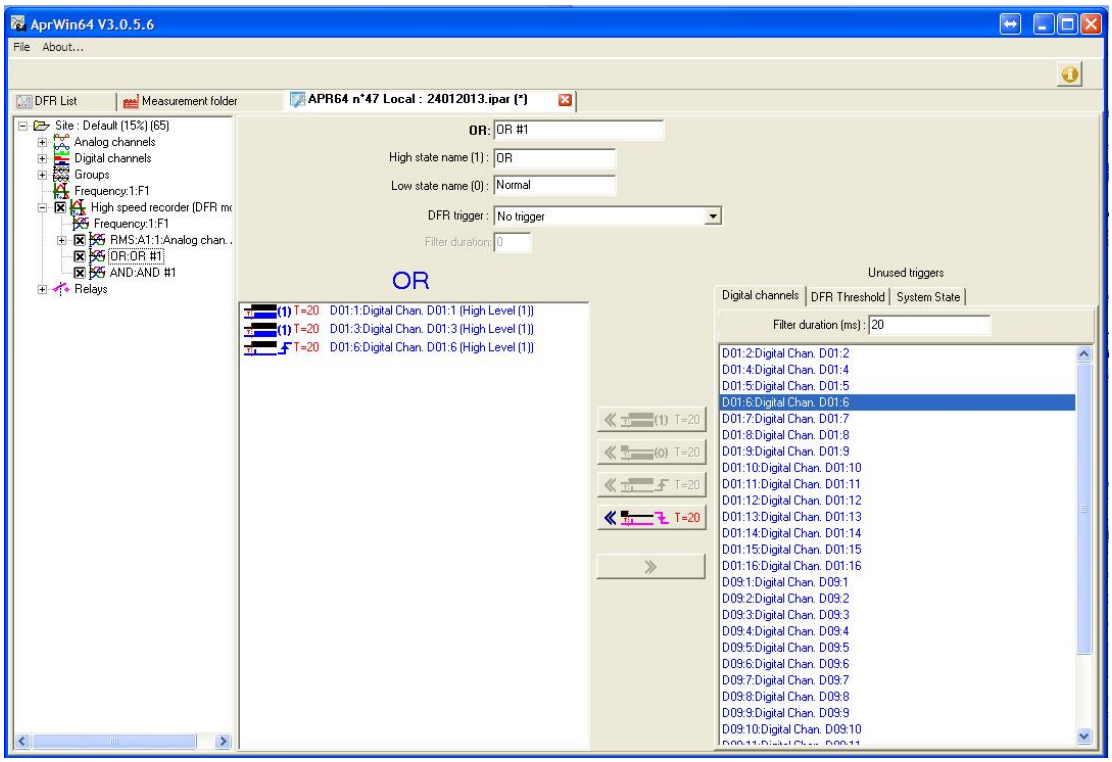


PS : It is possible to create more than one threshold for the same value (90% , 70% and 10% for example)

OR FUNCTION

D01:L1: name (↓) OR max Threshold UA.TR132 (↑) OR D02:L16:name (↓↑)

If the channel L1 of the D01 Rack goes to 0 OR if there a max threshold on UA.TR132 OR if the channel L16 of the D02 Rack goes to 0 or 1 then the OR function is true.

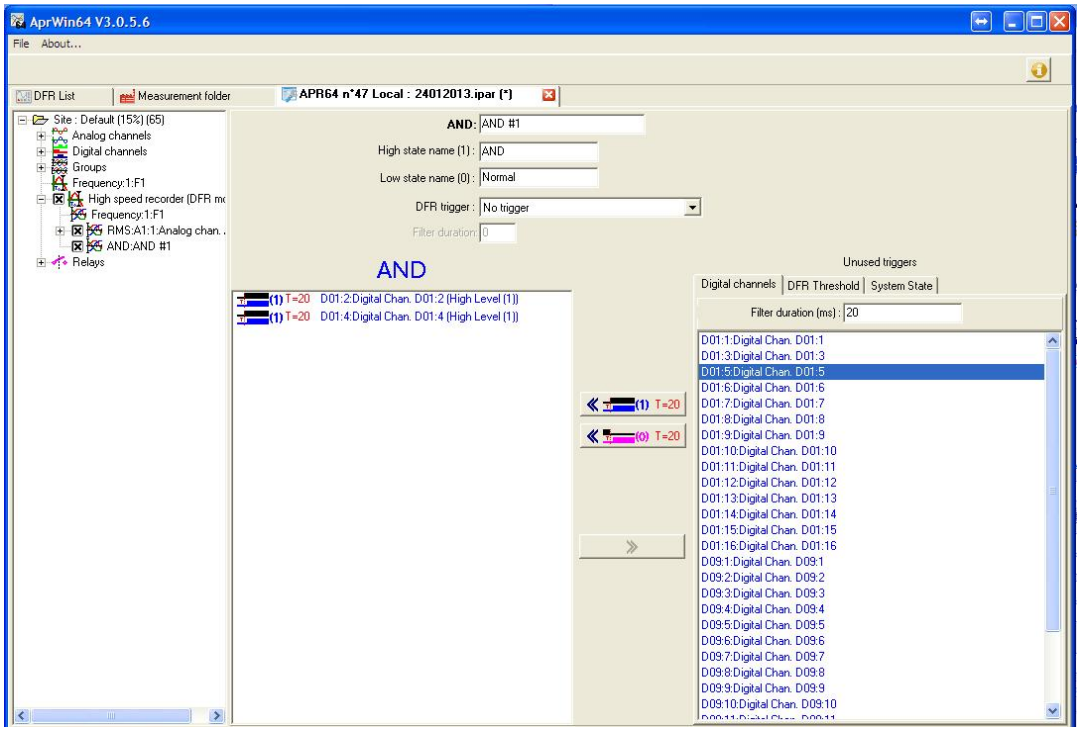


OR function can be used to trigger or inhibit the APR64 or to activate a relay.

AND FUNCTION

D1:L1:name channel (0) ET D3:L7:name channel (0)

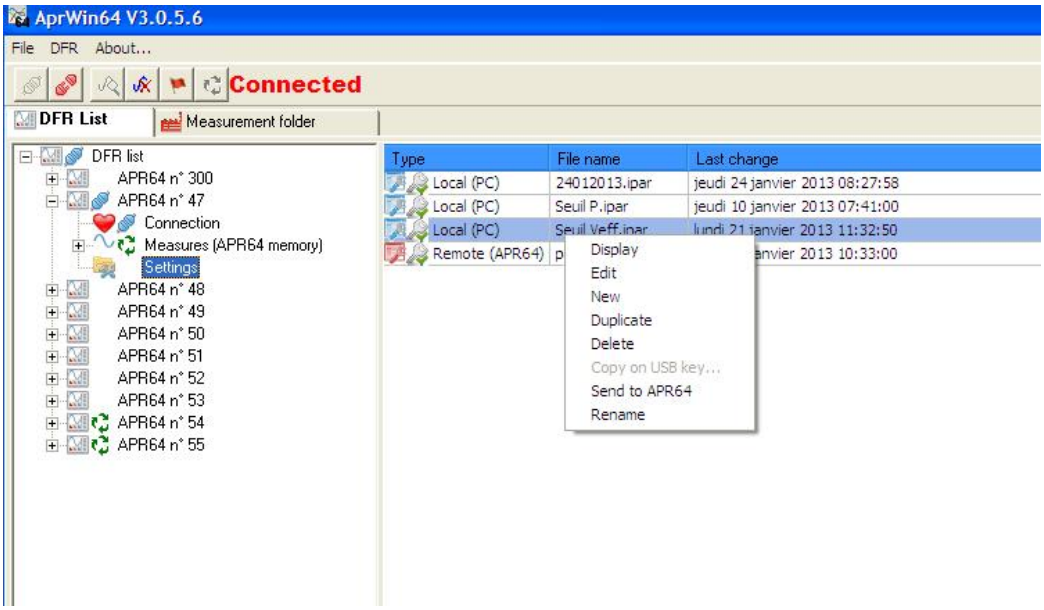
If the channel L1 of the Rack D1 AND L7 of the rack D3 are in low state, then the AND function is true.



AND function can be used to trigger or inhibit the APR64 or to activate a relay.

Sending the program to the APR64

Connect the PC and the APR64 (Menu connection)
In the DFR manager, select the APR64 setting and then right click "Send to APR64"



Display in real time

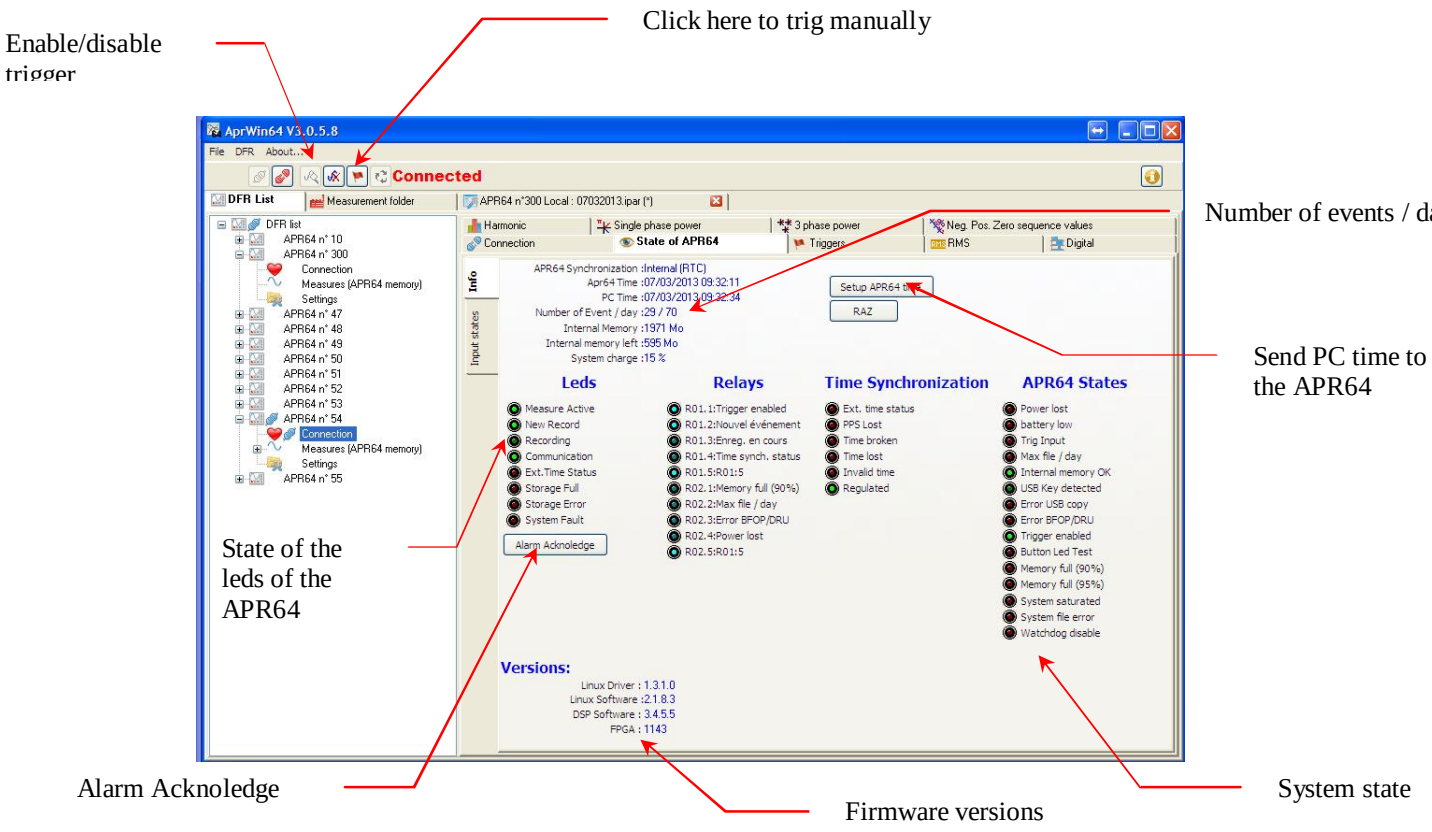
As soon as the programming is finished, The Software can display realtime values

PC must be connected to the APR64 (see connection menu).

On peut afficher les onglets suivants :

- Display of APR64 status
- Display of trigger states
- Display of RMS values
- Display of digital channels state
- Display of harmonics
- Display of active, reactive, apparent power with vectors
- Display of symetrical components

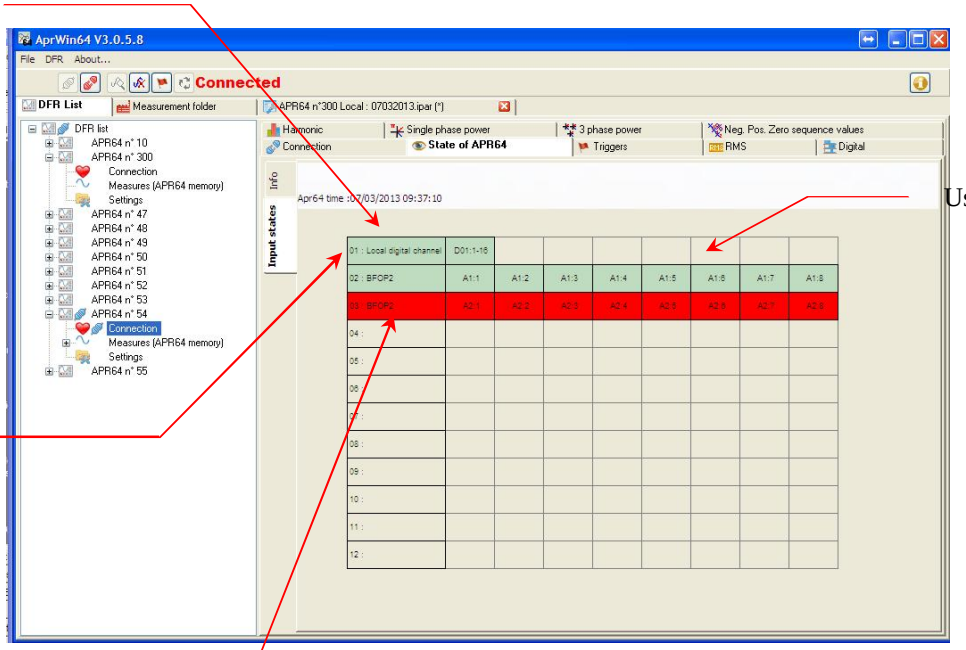
After a programming of the APR64, it is **neccessary** to display real time measures and to enable triggers .



Display APR64 Status

The following screen display the status of the unit. It allows to know which channel is connected and used.

Number of channel 1 to 12



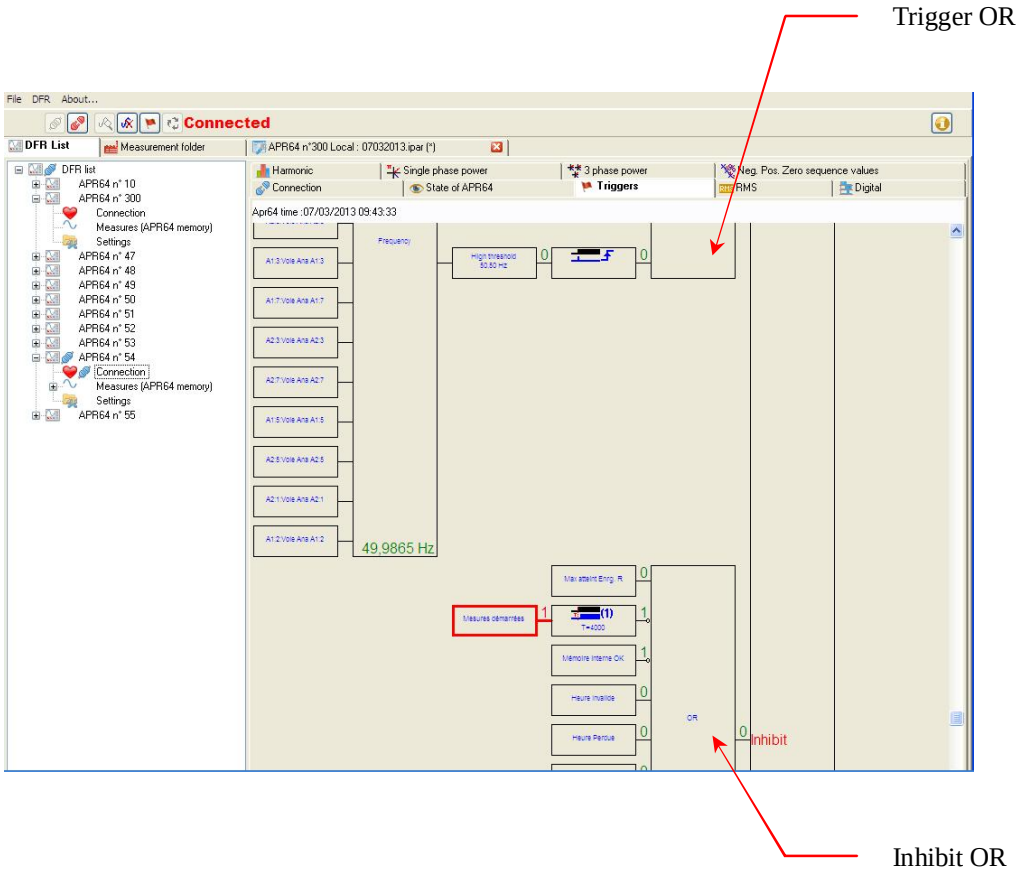
Used channel OK (Green)

Channel 1 if equipped with digital channels

Canal used but in error (Red)

Display of triggers

This screen is a diagnostic screen for the APR64. It permits to verify the state of each trigger

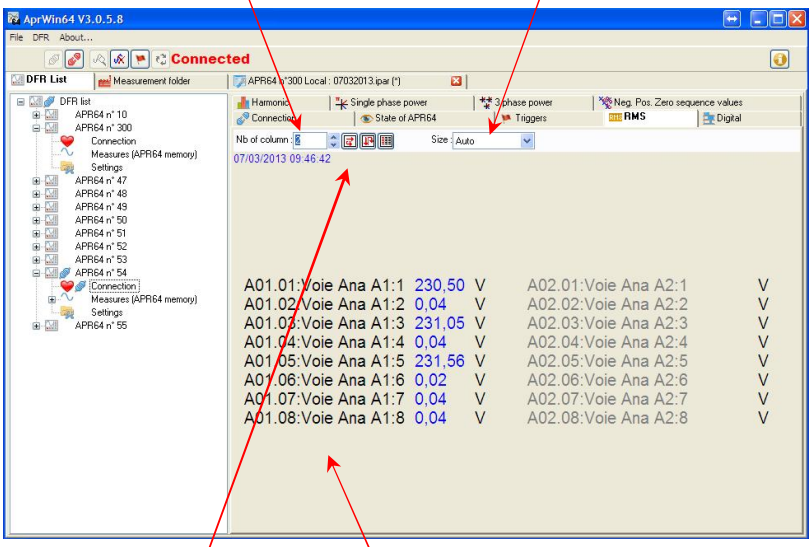


Normally no trigger has to be activated.

Display of RMS values

Number of column can be modified

Size of characters

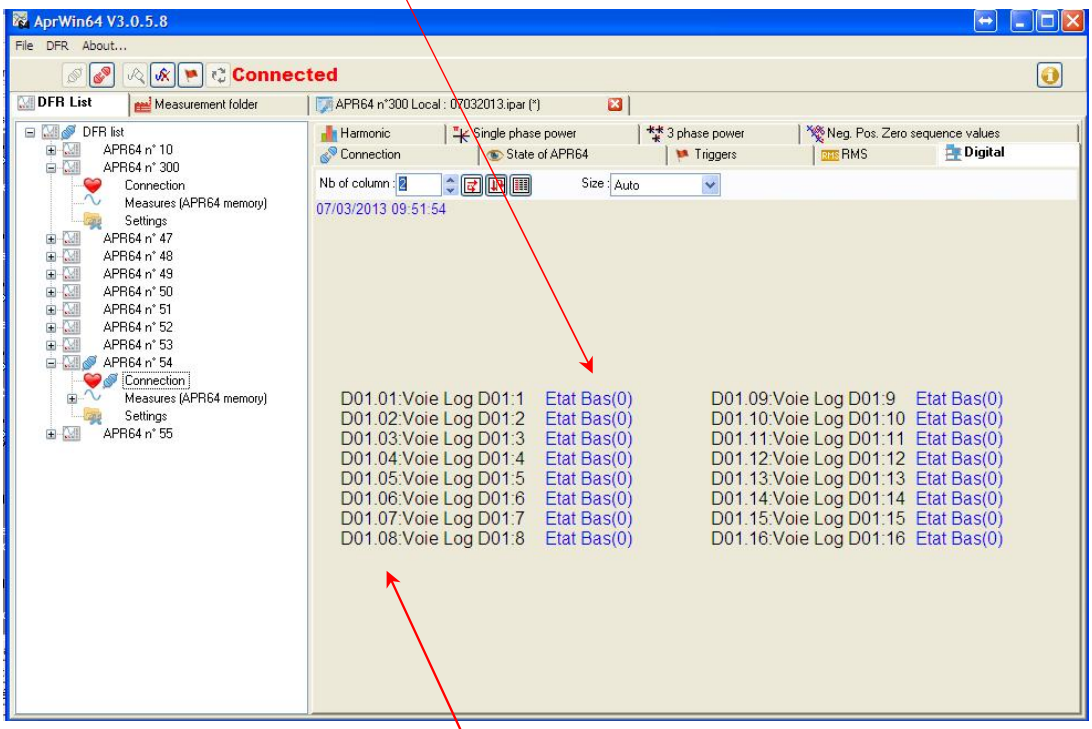


Numbering from high to low or left to right

Analog channels are named A01:02:xxxxx (channel 02 of the connector 1 is called "xxxxx")

Display of digital channels

State of the digital channels



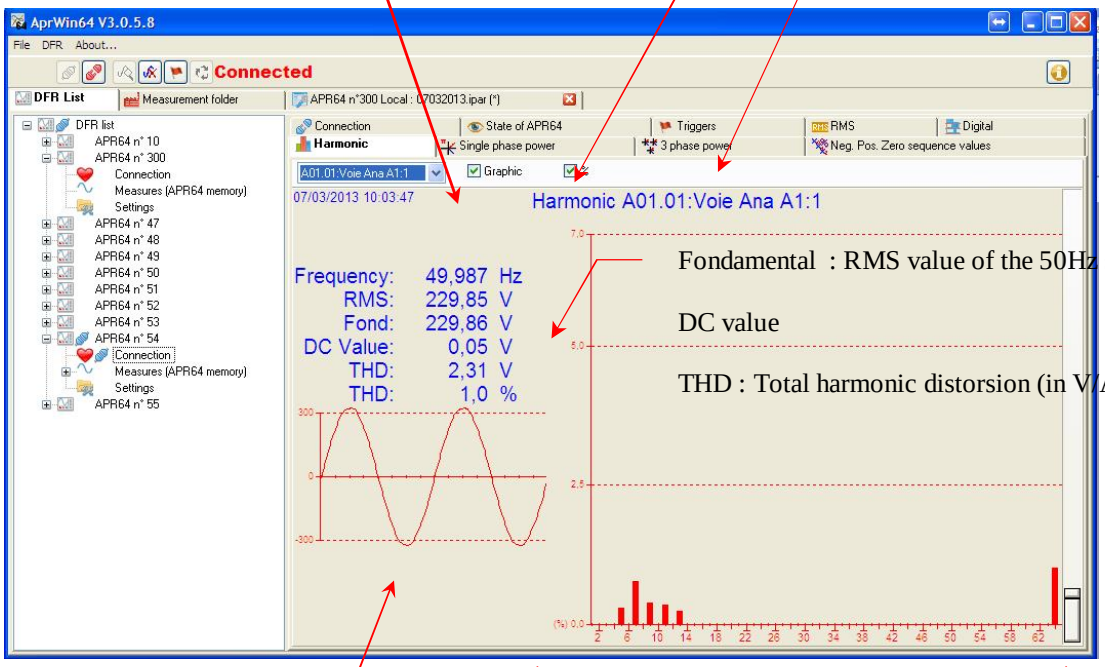
Digital channels are named D01:02:xxxxx (channel 02 of the digital rack #1 is called "xxxxx")

Display of harmonics (Graphic mode)

Display of harmonics in graphical or numerical mode

Choice of the analog channel

Display in the % or in value



Fondamental : RMS value of the 50Hz signal)

DC value

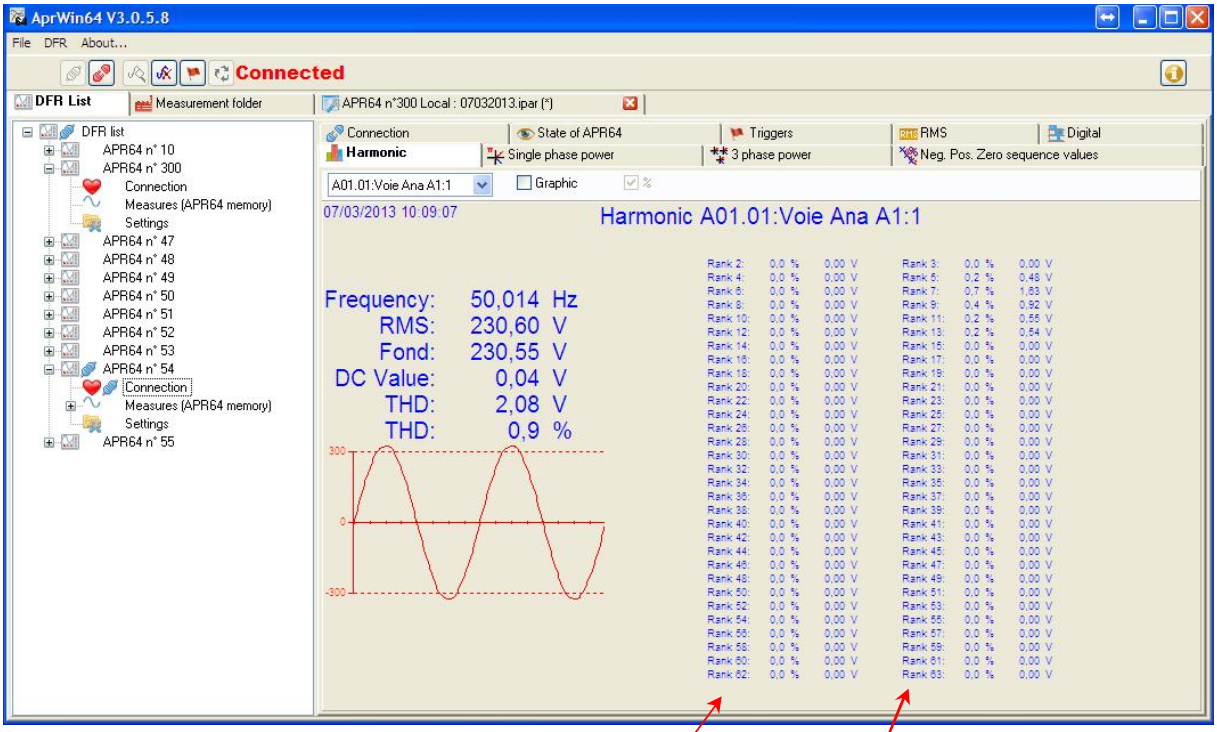
THD : Total harmonic distorsion (in V/A or %)

curve

Harmonics from 2 to 63 and Global (THD)

Change the display scale

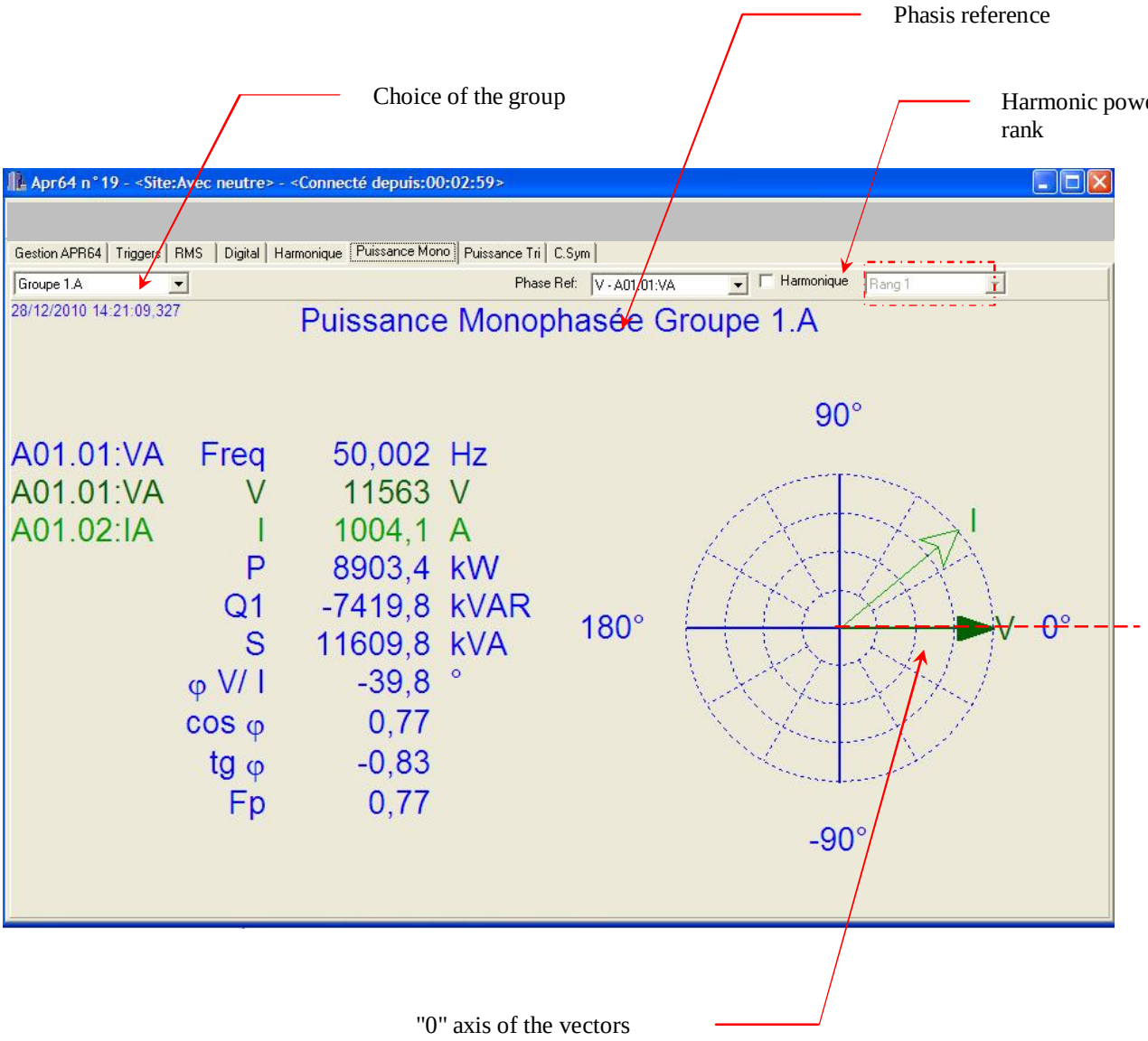
Display of harmonics (Numerical)



Even ranks
from 2 to 62

Odd ranks from
3 to 63

Display of single phase Power



V=RMS Voltage
I=RMS current
P=Active power
Q1=Reactive power of the fundamental
S= Apparent power (UxI)
φ V/I=Phasis of the voltage/current
Cos φ, Tg φ
Fp : Power factor

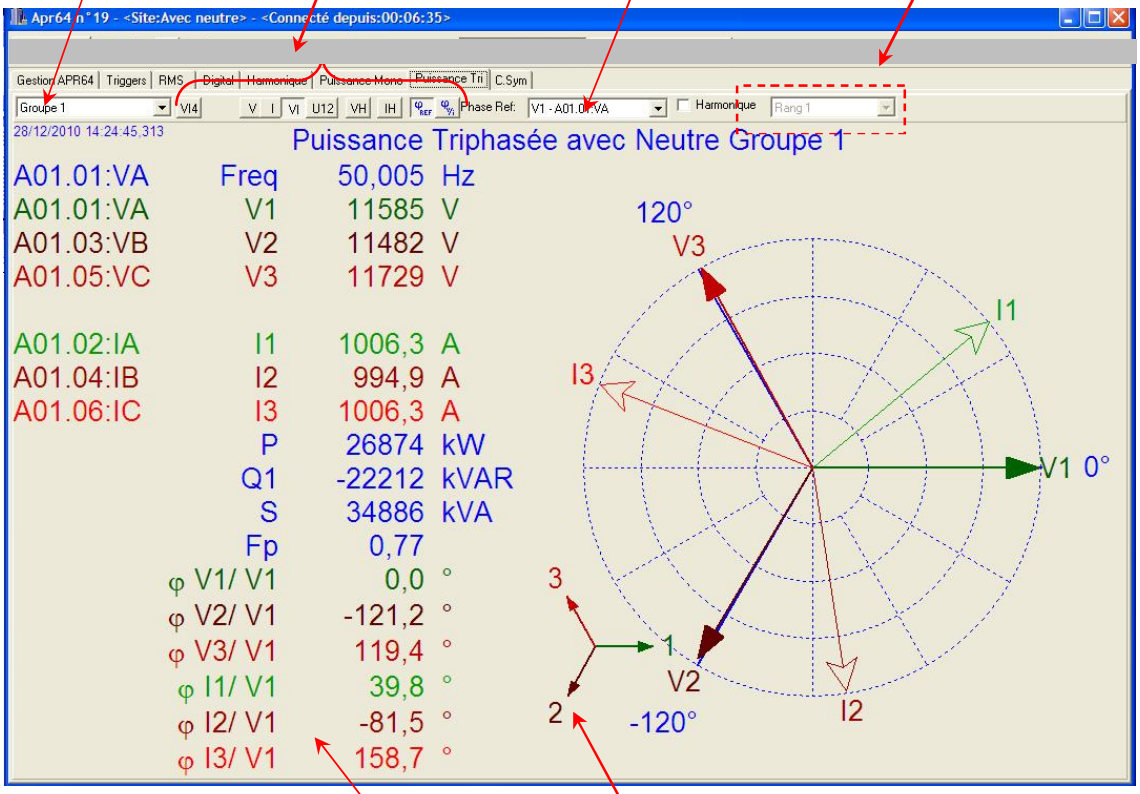
Display of Triphase power

Choice of the group

VI4 : Display of voltage/current and homopolar values
V : Display of the 3 voltages
I :Display of the 3 currents
VI : Display of 3 voltage and 3 currents
U12 : Display of composed voltages
VH : Display of homopolar voltage
IH : Display of homopolar current

Ref phasis (0 axis of the diagram)

Choice of rank for Harmonic power



"Direct" (1,2,3)

P : Active power
Q1 : Reactive power(for the fundamental)
S : Apparent power (UxI)
Fp : Power factor

Φ Ref : Display of phasis according to the ref phases

ΦV/I : Display Voltage Phasis according the currents

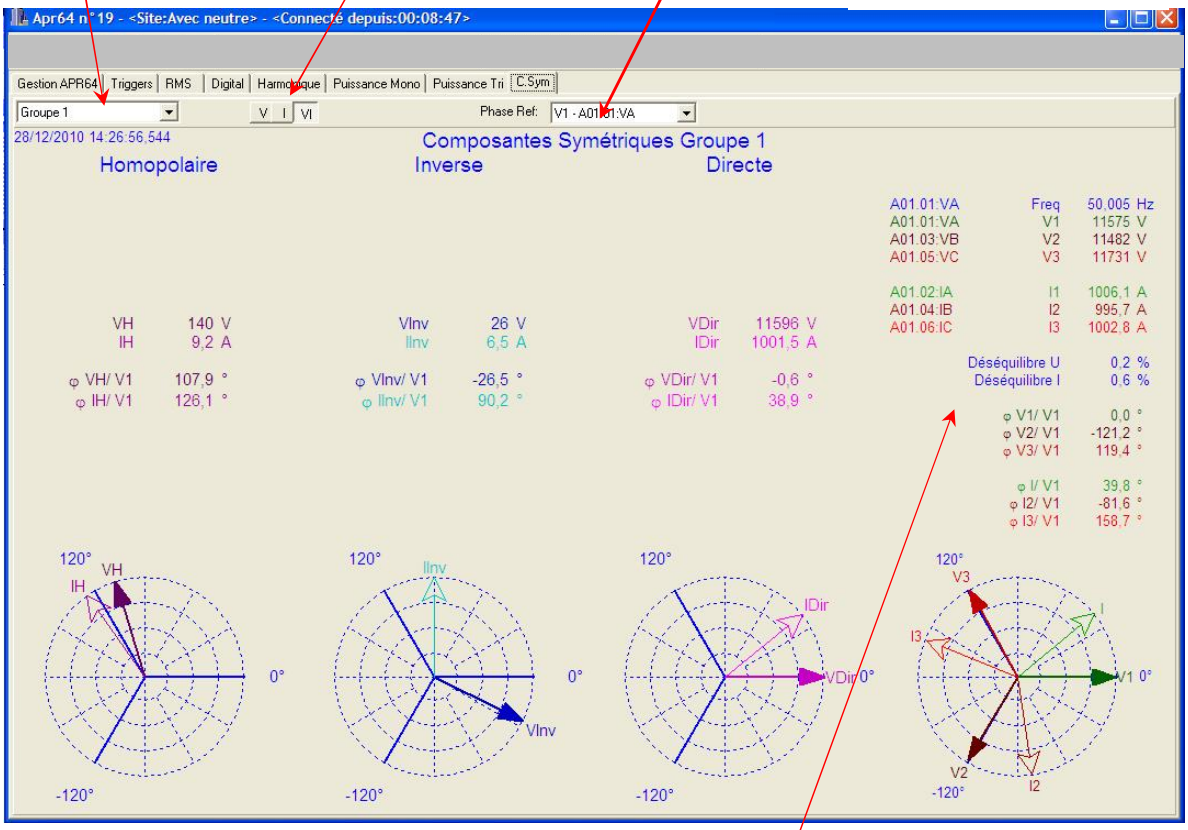
Display of symetrical components

(Direct, reverse and homopolar voltage, and currents)

Choice of the group

V : Display of 3 voltages
I : Display of 3 currents
V/I : Disply of 3 currents and 3 voltages

Choice of the reference (0 Axis)



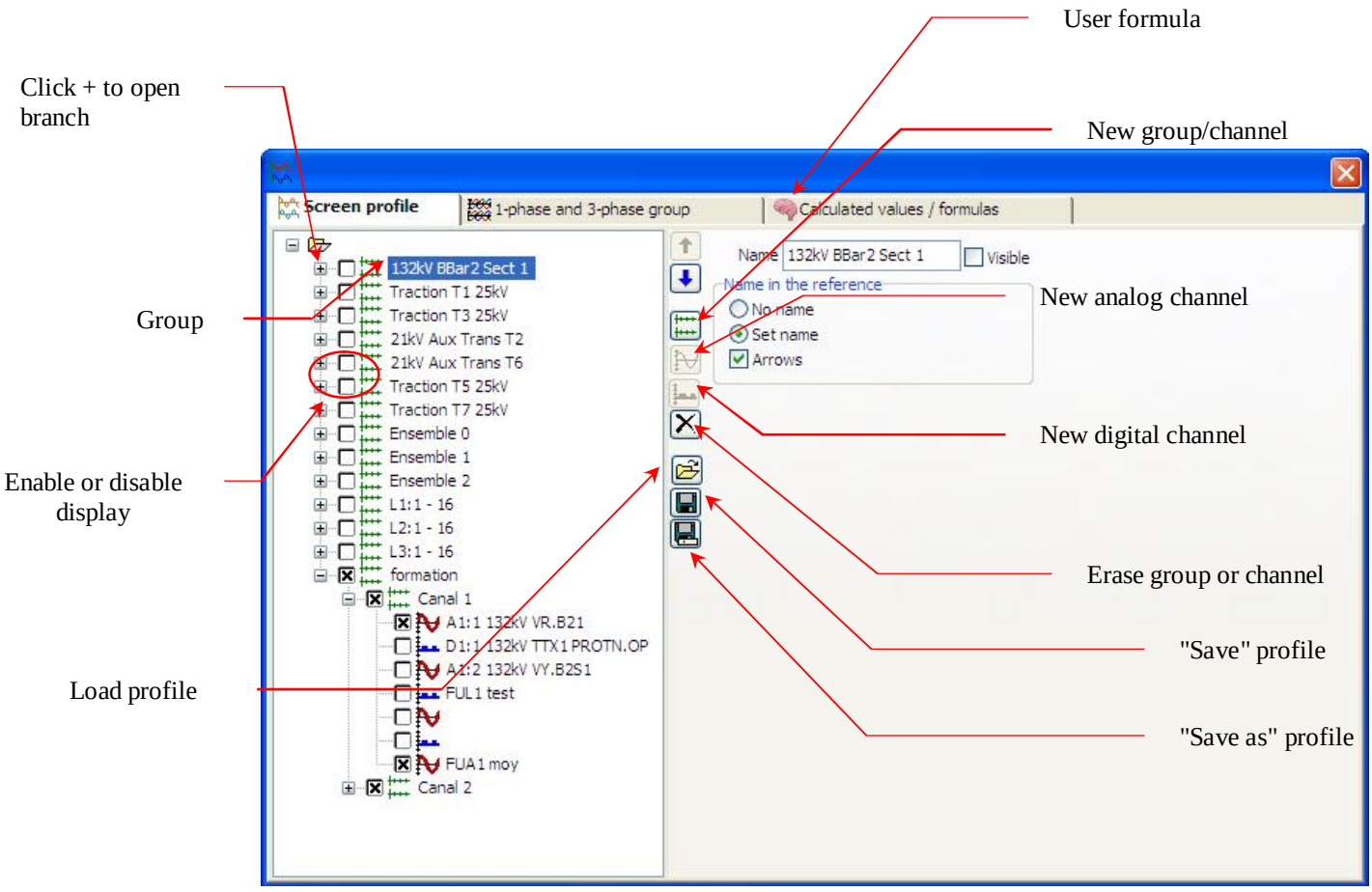
Display of the homopolar, direct, reverse voltage and currents

Unbalance rate for voltage and currents

Display profile

Curves are displayed on screen (or printer) according to a profile (group, channel, position, color, scale …). The profile is setup in the folowing screen.

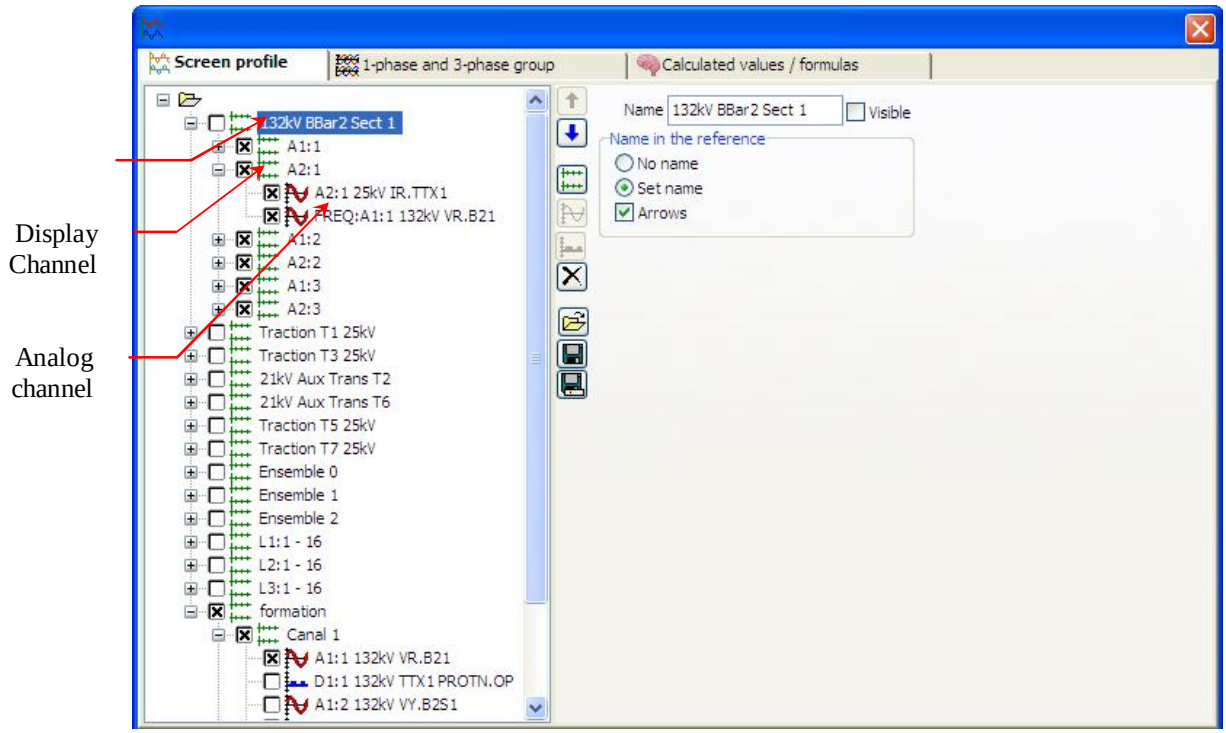
Profile screen is displayed when clicking in curves margin or on the icon.



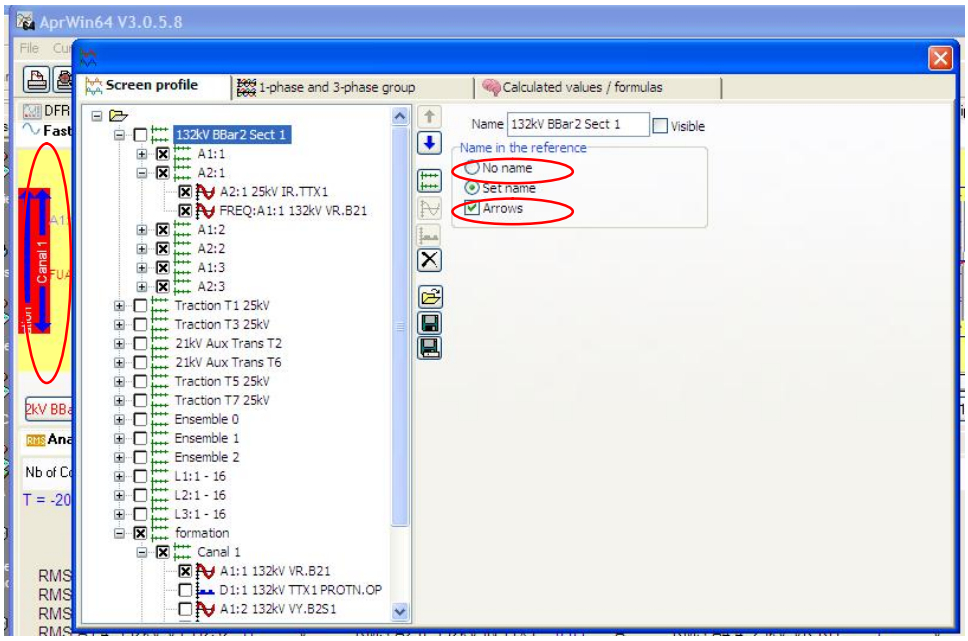
"Screen" is composed of groups , channels, analog, digital, and calculated values (analog and digital). Calculated values are predefined in the list box (Harmonics, RMS ..) or can be programmed with formulas.

Modifications are WYSIWYG

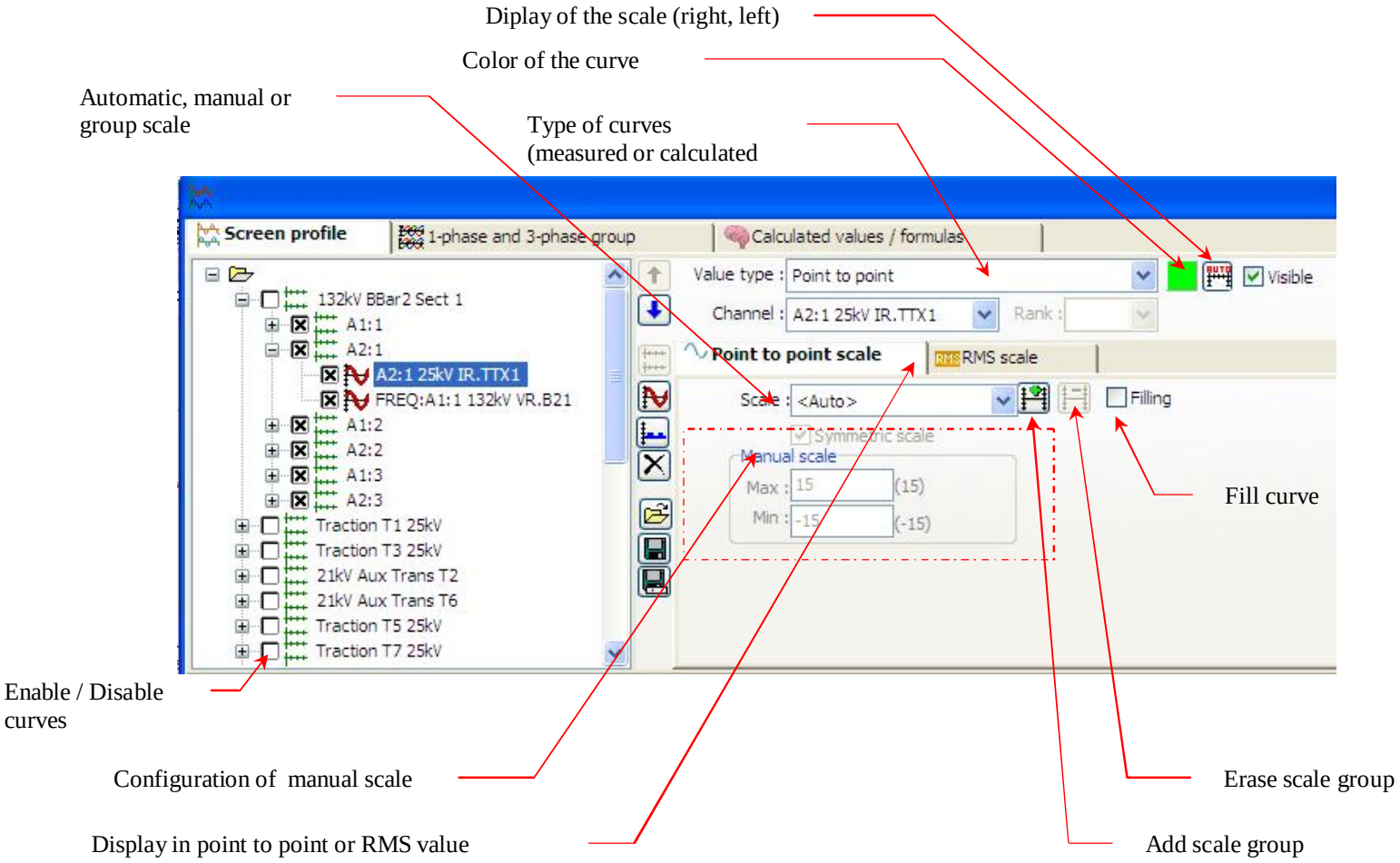
Example :



The name of the groups are drawn in the margin of the curves

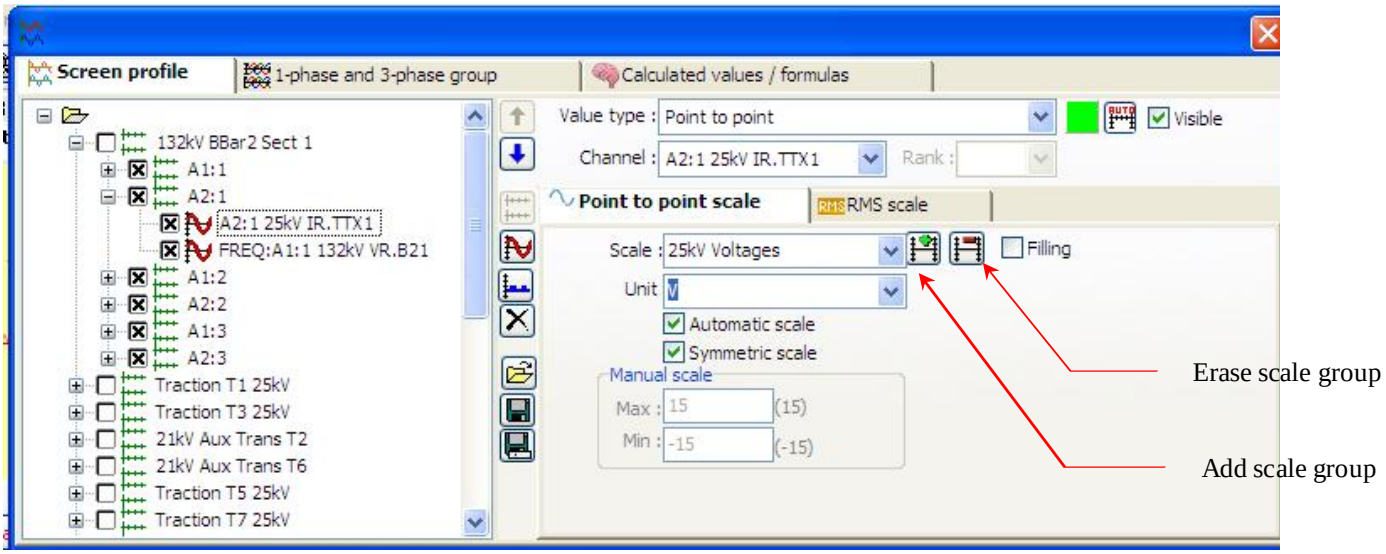


Each channel can be configured separately.

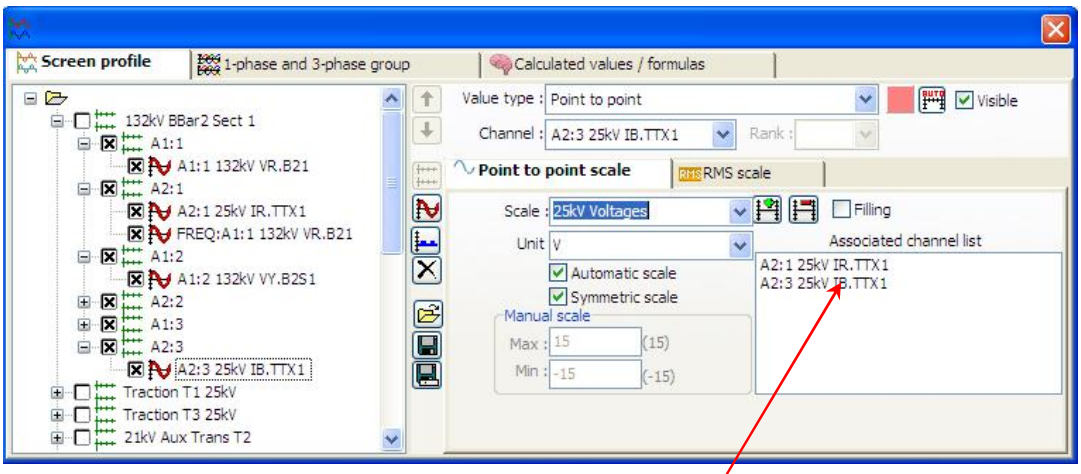


Scale group

Scale group allow to display many channel with the same scale. Scale group is the best draw, method.
When clicking on , you add un new scale group : On définit son nom ("Tension 20kV"), on définit l'unité ("Volt"), et on définit le type d'échelle ("Echelle Auto" et "Echelle symétrique").



Choose the scale in the listbox "25kV Voltages" for example :



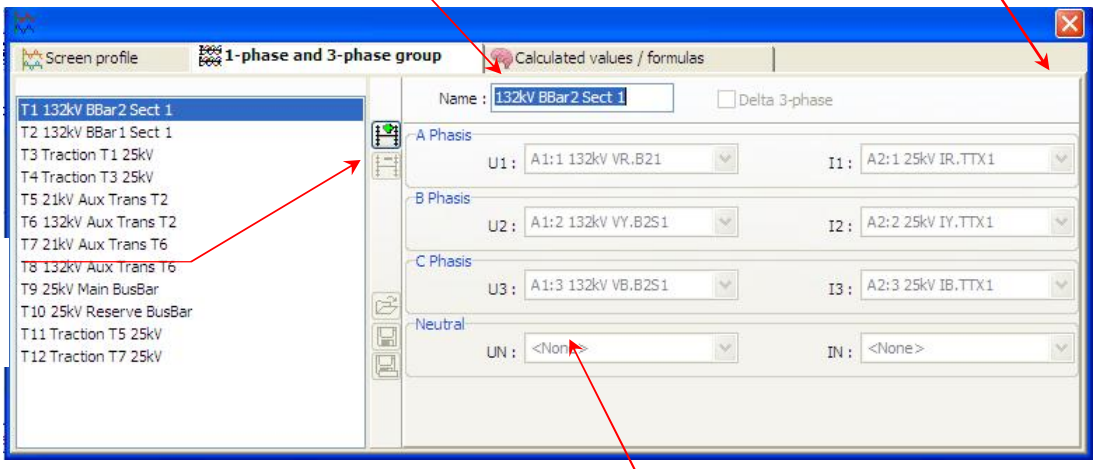
The 2 analog channels are drawn with the scale named "25kV Voltages"

Single and 3 phases groups

This screen allows to create new channel associations in oder to calcule powers or symetrical components …

Name of the group

Tyep of group (Single phase, 3-Phases with or without neutral



Add or delete a group

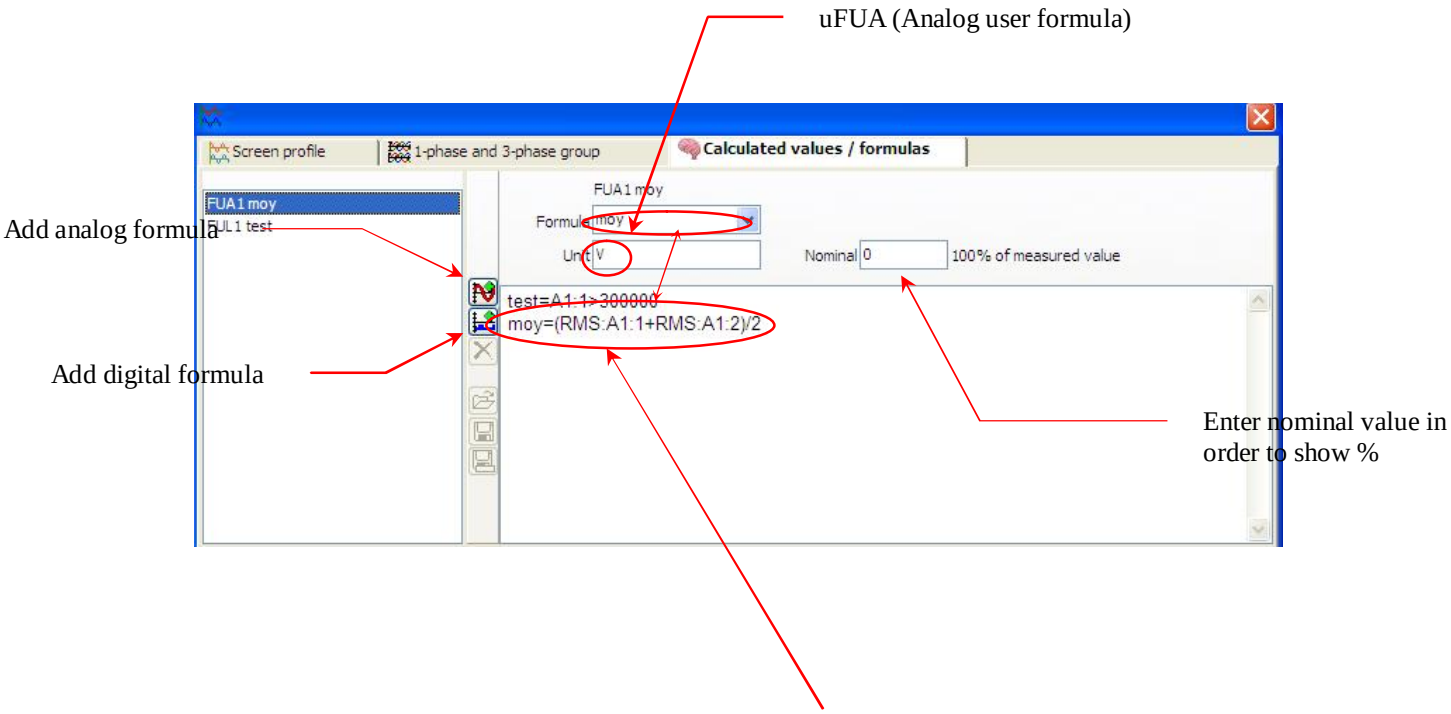
Choice of channels

Notes :

- It is possible to calculate powers and other values in DFR mode but not possible in trend mode.
- It is not possible to delete groups created inside the APR64

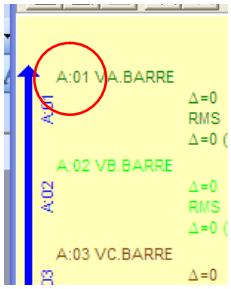
User formulas

This screen allows to create hand made formulas with analog and digital channels
It is possible, for example, to make the sum of the differents outgoing currents.



Formulas are written respecting the name and identifier of the channels and then affect the formula to the name in the listbox.

Caution : If there is an error in the formula, the name is not in the listbox,



VEFF:A01:03 is RMS value of analog channel BFOP #1 channel 3

Valid opreator in formulas are :

+ : sum
- : substraction
* : multiply
/ : divide
( )
> superior
< inferior
Abs = absolute value
=>Superior or equal
=< Inferior or equal
Sin(angle in °)
Cos(angle in °)

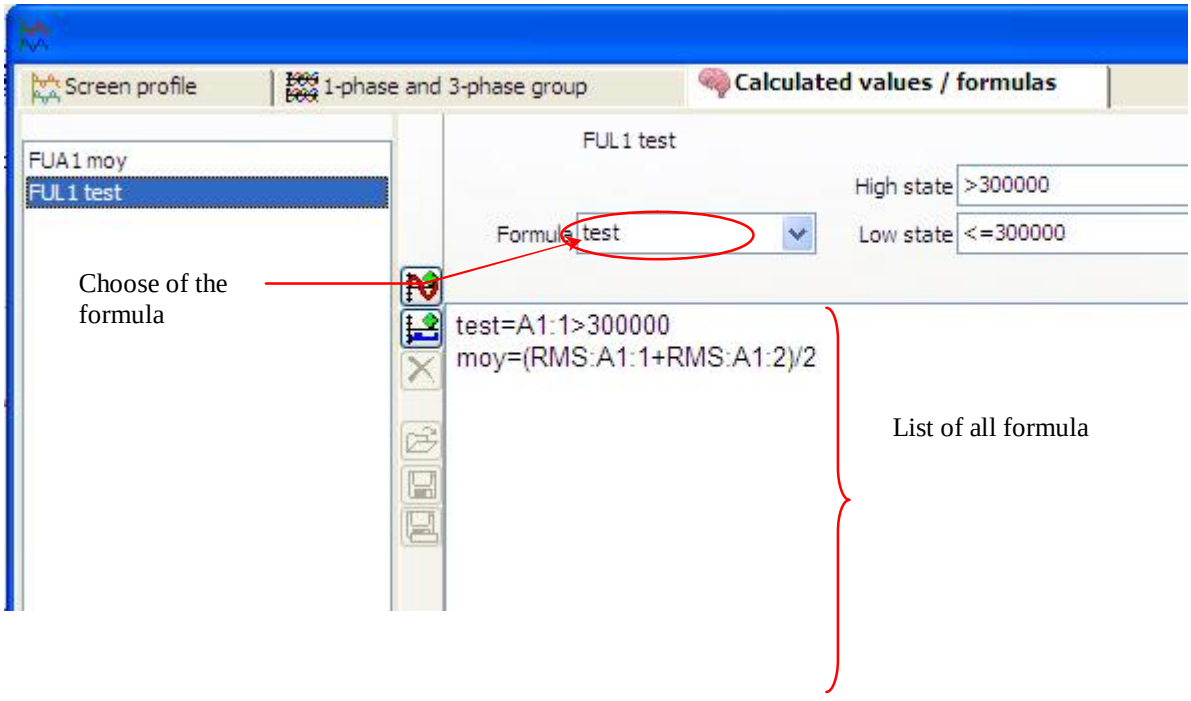
Example : Current_sup40A=A:01>40

Digital chanel "Current_sup40A" is 1 when the analog channel "A:01" is over 40A in peak

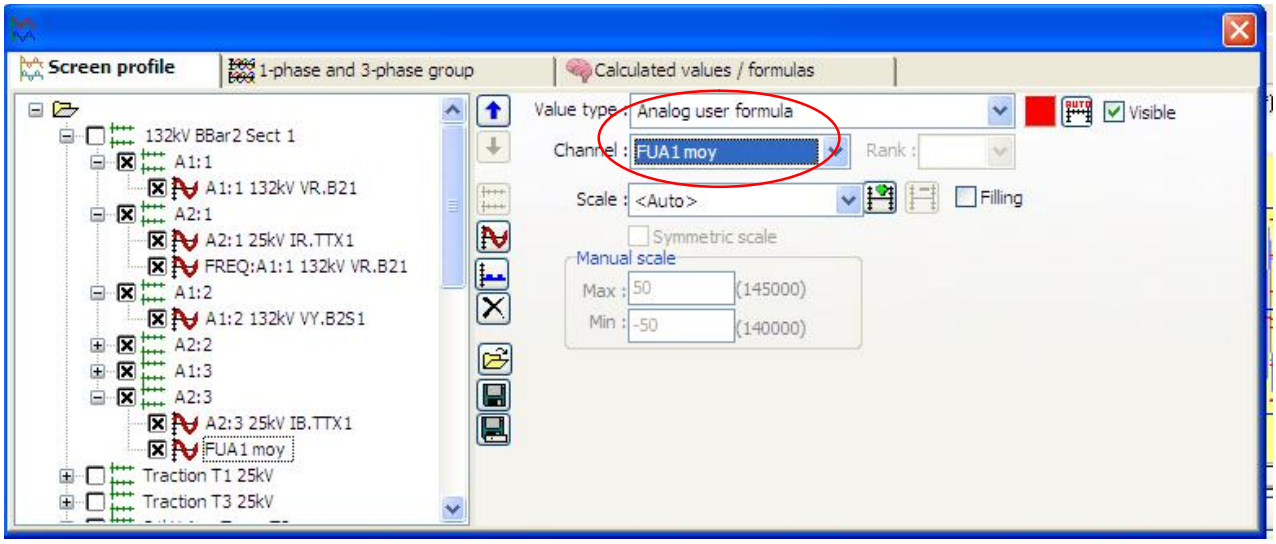
Example : Courant_sup40A=RMS:A:01>40

Digital chanel "Current_sup40A" is 1 when the analog channel "A:01" is over 40A in RMS

Digital user formula (uFUL)



In order to display formula, you have to choose the values in the listbox.



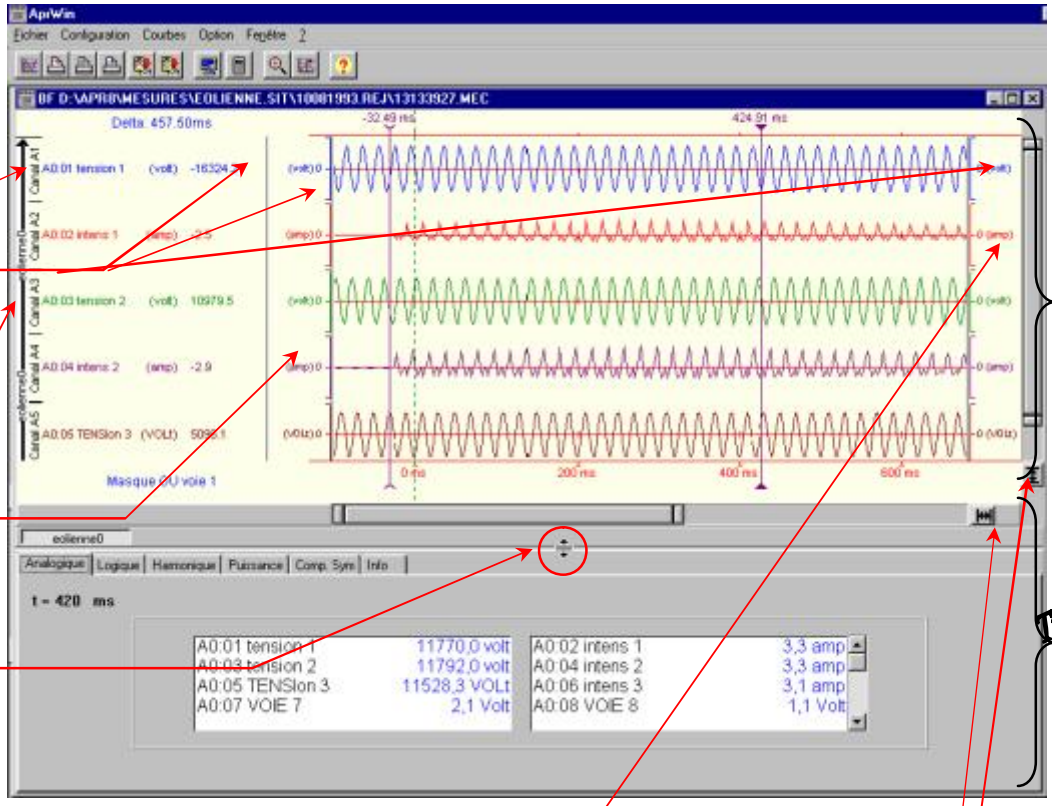
Display of measures

Overview

The window is divided into 2 zones, upper zone which contains curves and lower zone which contains values (RMS values, digital channels, powers, harmonics …). The one or another one of the parts can be enlarged or reduced thanks to the horizontal *Split*.

The displaying of RMS values, digital channels, powers ... is according to the position of the active cursor in the "curves" window.

These functions are available either un DFR or Trend mode.


Channel name
The size of margins can be changed by the vertical split
Group name
Click here to view//modify screen profile
Horizontal Split for sharing the window.
Curves
Treatments
Scrollbars (horizontal and vertical) allow to scroll curves or to increase / decrease the scale.
Display the maximum of curves or the complete zone

Display of curves and treatments

Scrollbar (vertical and horizontal) have 2 functions: Scrolling when using the middle of the scrollbar and zooming when using the begin and the end.

Use the menu *Curves/Colours* to change the background colour of the window.

Description of the icon bar :

Printing of all curves

Printing of the some curves (zoom)

Printing of the selected measurements

Copy of the curves into the clipboard

Processing of the next file

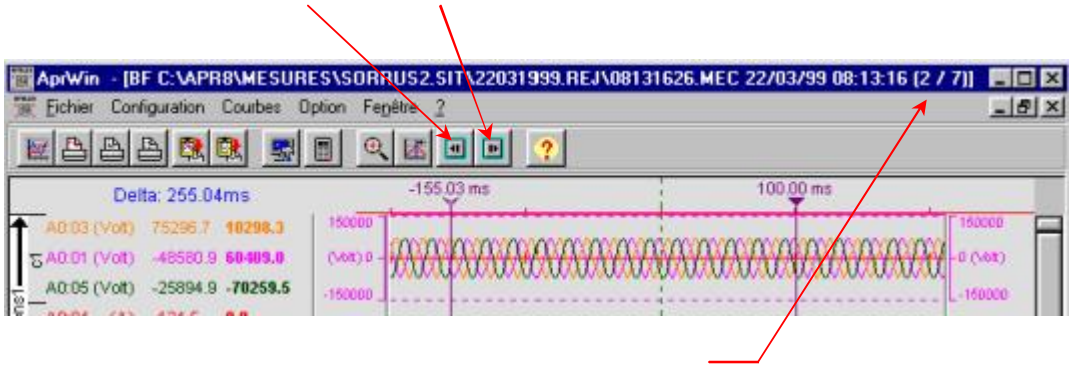
Processing of the previous file

Display of all selected files

Displaying mode (Vrms or point to point)

Zoom between the two cursors

use *Previous* and *Next* icons to display the other files when several files were selected in the site manager.


AprWin - [BF C:\APR8\MESURES\SORRUS2.SIT\22031999.REJ\08131626.MEC 22/03/99 08:13:16 (2 / 7)]
Fichier Configuration Courbes Option Fenêtre ?
Delta: 255.04ms
-155.03 ms
100.00 ms
A0:03 (Volt) 75296.7 10298.3
A0:01 (Volt) -48580.9 60409.0
A0:05 (Volt) -25894.9 -70259.5

Display curves

Display curves and treatments

Display treatments

Show screen profile

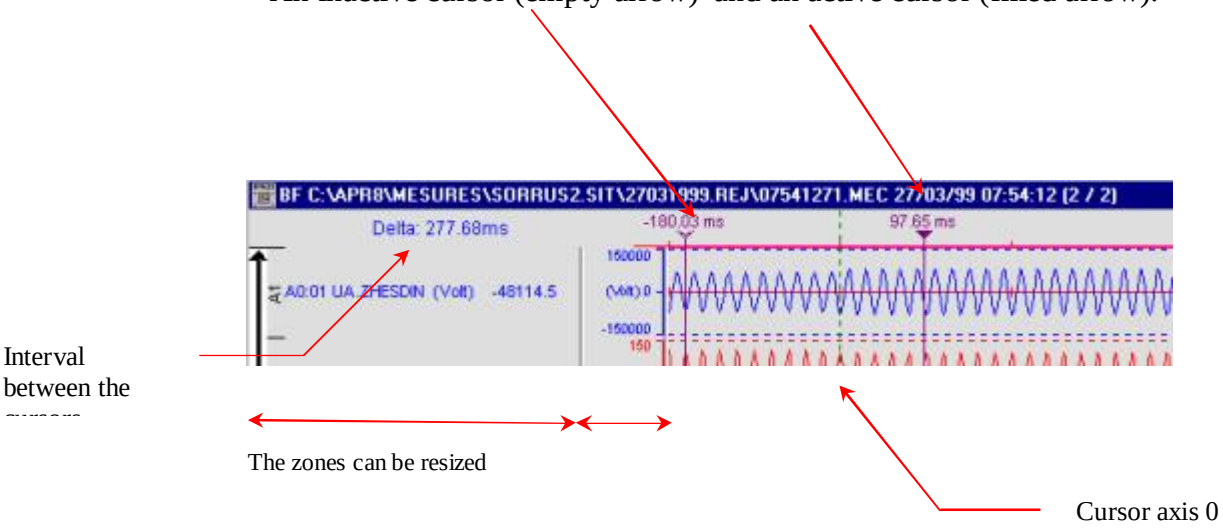
Open screen profile

Save screen profile

Save as screen profile

Two cursors are set on screen :

An inactive cursor (empty arrow) and an active cursor (filled arrow).

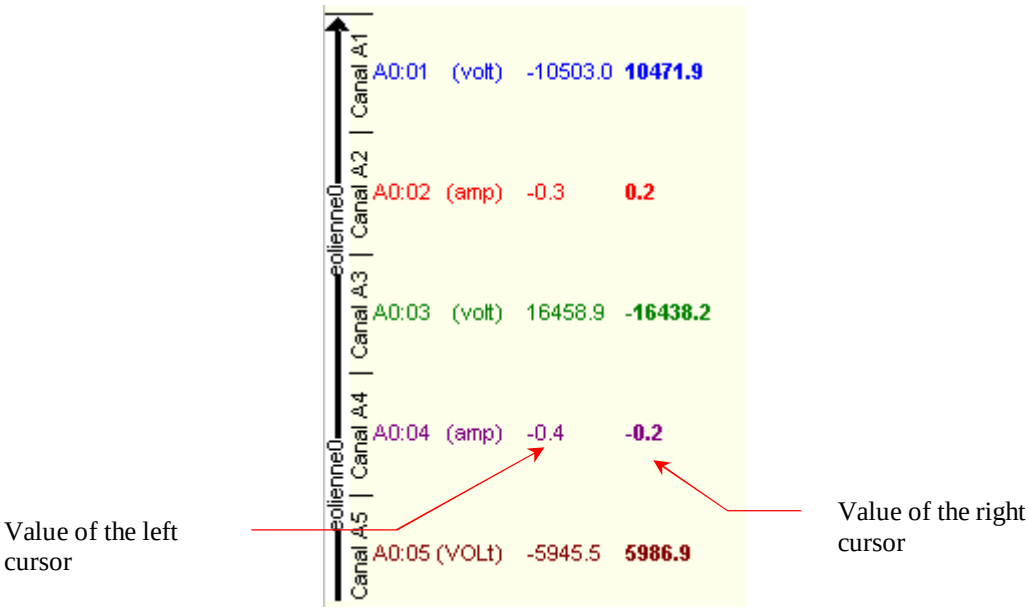


The axis 0 (in dotted line) corresponds to the trigger time.

If the cursor is not visible, click at the top of the window to move it where the mouse is.

To display the screen parameters of a special curve, double click on this curve, the screen parameters appears then

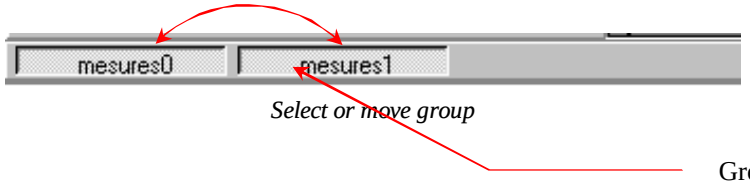
Left margin allows to display either the name of the link or the values of cursors (active / inactive) and channels. Click in the margin to change the display mode.


eolienne0
Canal A1 | Canal A2 | Canal A3 | Canal A4 | Canal A5
A0:01 (volt) -10503.0 10471.9
A0:02 (amp) -0.3 0.2
A0:03 (volt) 16458.9 -16438.2
A0:04 (amp) -0.4 -0.2
A0:05 (VOLt) -5945.5 5986.9
Value of the left cursor
Value of the right cursor

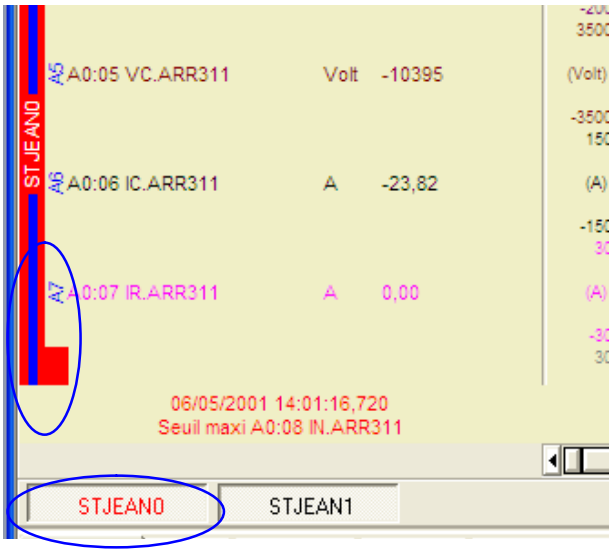
Example de margin

Values displayed in the margin correspond to the value of the curve at the intersection with the cursor (Peak value if sin waves is displayed or Rms values if this mode is selected).

The bottom of the screen displays all the groups which were defined in the screen parameters. By clicking buttons, you can valid/unvalid the displaying of a complete group. To reverse the displaying order of the groups, drag and drop to the wished place.



The group and channel that contains the "trigger" are displayed in red. This allows to see very quickly the faulty channel.

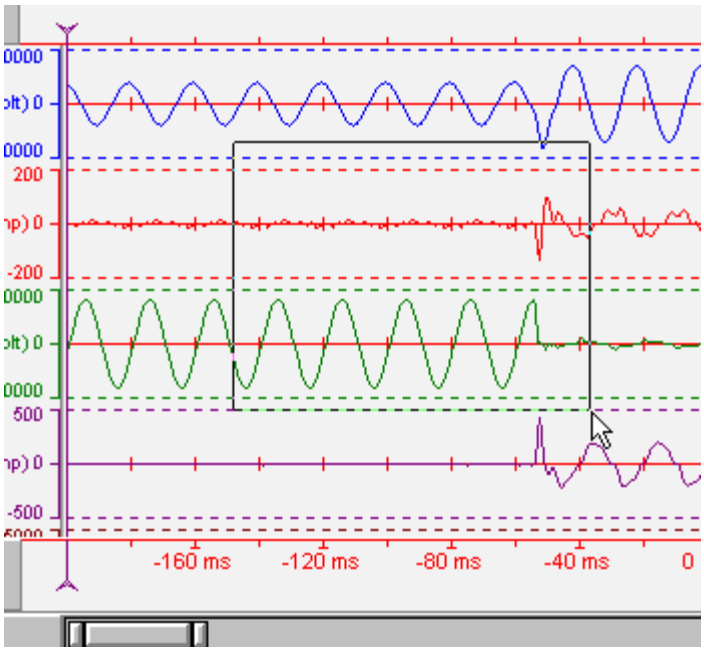


Display curves

Select one or several measurement files in the site manager and select the displaying.

Curves will be displayed with the current screen parameters (defined in the measure folder (*Screen profile* branch).

For zooming on a part of the screen, drag the beginning of the zone and drop to the end of the zone. As soon as the mouse button is released, the selected zone is redrawn.



Zoom on a part of the curves

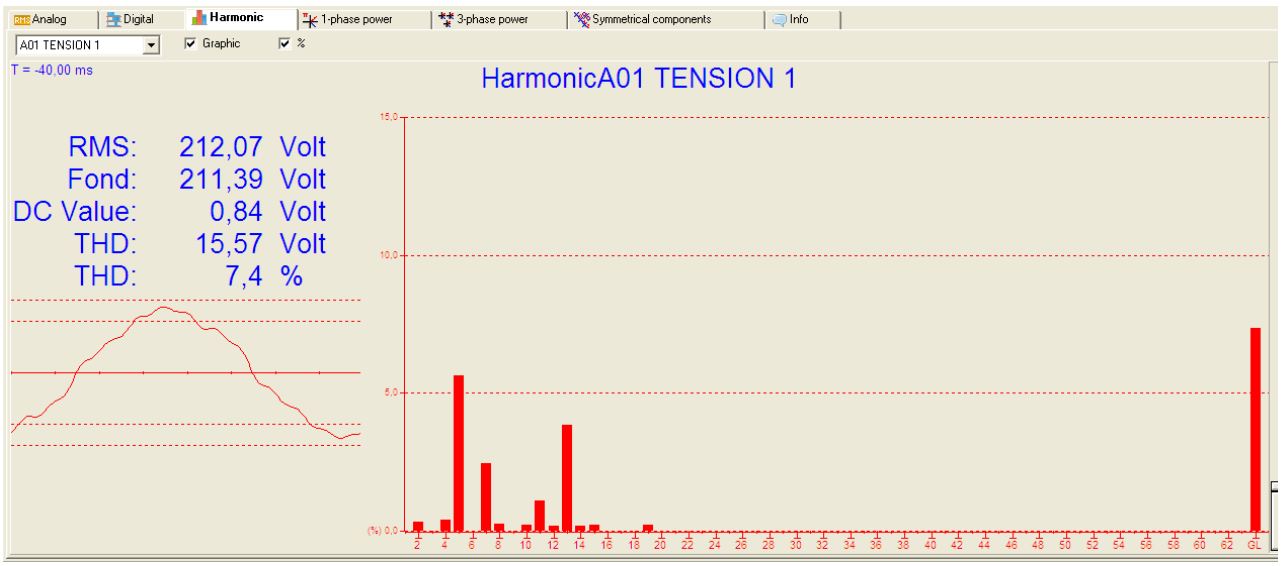
You can display the screen parameters by double clicking in a channel margin.

Displaying of values (Vrms, Harmonics, Powers …)

Half bottom of the window displays several tabs which one contains a different type of measurements.

Measurements are displayed at the time indicated by the active cursor. Move the active cursor by means of the mouse to display all the measurements.

The screens and data displayed are the same than in realtime (see page 44).



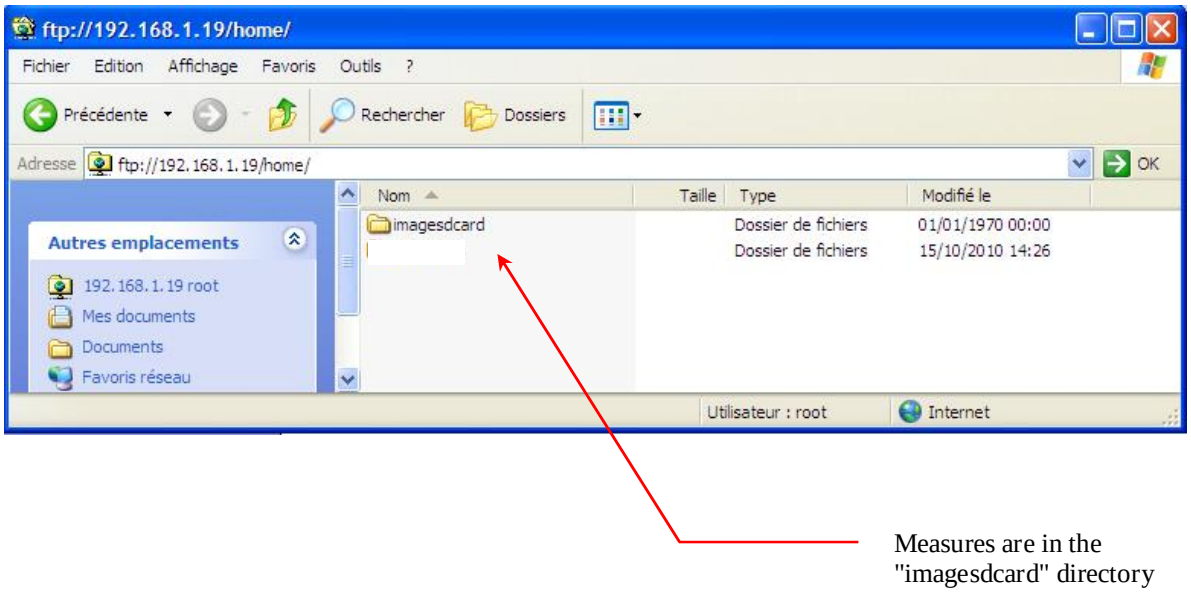
Example for harmonics

FTP connection

You can connect to th APR64 using an FTP software (Internet explorer, FTP expert, Filezilla …)

Connexion can be done using IP address of the APR64, FTP port (21), user name (apr64) and password (dfv)

Example : ftp://apr64:dfv@192.168.1.19:21



Measures are in the "imagesdcard" directory

Appendix 1 : files structure

On APR64

imagesdcard\mesures\site.64\jjmmaaaa.rep\f110111-11284530-03-99-00-0002-xxxx-decl._par_pc.*

Site name

Day directory

Name of file

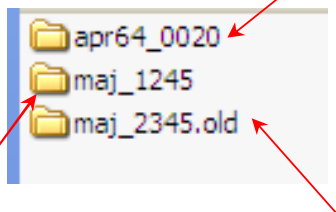
On USB Key (After "copy USB")

\Apr64_xxxx\mesures\site.64\ jjmmaaaa.rep\f11011111284530-03-99-00-0002-xxxx-decl._par_pc.*

Serial # of APR64 (An USB key can contain more than one APR64)

On the USB key for software upgrade

Backup of Apr64 n° 0020



Upgrade for Apr64 n° 1245 (not yet done)

Upgrade for apr64 n°2345 (done because renamed in .old)

Appendix 2: APRWIN64 Workspace

Data ß Place defined in "File/setup"
  APR8-16
  APR64 --< Setup of apr64
    Fichier
    Machine
      19
        Local
        Distant
      123
      ……
  COMTRD
  CSV
  DIR à Database for directory
  ELODI
  LIC à Licences for the APR64
  SITE.INI à configuration of the site

Note :please backup this directory

Appendix 3 - File format

DFR, Trend Mode

For each event the following files are generated by the APR64

directory : \home\imagesdcard\mesures\xxxx.64\AAAAMMJJ.rep\filename

- Config file TYPE.AAAAMMJJ-HHMNSSCC-TT-GG-RR-NNNN-IIII-NC.CFG
- Binary file TYPE.AAAAMMJJ-HHMNSSCC-TT-GG-RR-NNNN-IIII-NC.DAT
- Param file TYPE.AAAAMMJJ-HHMNSSCC-TT-GG-RR-NNNN-IIII-NC.HDR
- Compress file contains the 3 files .CFG, .DAT, .HDR
  TYPE. AAAAMMJJ-HHMNSSCC-TT-GG-RR-NNNN-IIII-NC.tar.gz

Where

TYPE=F(fast) , S(slow), Q(quality), C(continue), T(elecommande)
AAAA= Year
MM=Month
JJ=Day
HH=Hour
MN=Minute
SS=Second
CC=Cent second
TT=Trigger
- 00 : Permanent recording
- 01 : Manual trigger (Button)
- 02 : External Trigger
- 03 : PC Trigger
- 04 : Trigger by another APR64
- 05 : mini threshold
- 06 : maxi threshold
- 07 : dv/dt
- 08 : Trend mode Threshold
- 09 : digital channel : passage état 1
- 10 : digital channel : passage état 0
- 11 : digital channel 0 to 1
- 12 : digital channel 1 to 0
- 13 : return of mini threshold
- 14 : return of maxi threshold

GG= valeur of trigger

- 0=Frequency
- 1=RMS
- 2=PA
- 3=PB
- 4=PC
- 5=PN
- 6=P triphase
- 7=QA
- 8=QB
- 9=QC
- 10=QN
- 11=Q triphase
- 12=SA
- 13=SB
- 14=SC

- 15=SN
- 16=S triphase
- 17=FPA
- 18=FPB
- 19=FPC
- 20=FPN
- 21=FP triphase
- 22=COSA
- 23=COSB
- 24=COSC
- 25=COSN
- 26=COS triphase
- 27=TGA
- 28=TGB
- 29=TGC
- 30=TGN
- 31=TG triphase
- 32=V0
- 33=V1
- 34=V2
- 35=unbalanced V
- 36=I0
- 37=I1
- 38=I2
- 39=unbalanced I
- 40=Harmonic
- 41=Inter-Harmonic
- 42=THD/TDD
- 43=Digital channel
- 44=unknown

RR = rank for harmonics and interharmonics (00 for the other values)

NNNN : N° of the value in CFG file 0000 if unknown or not possible

1,A1:1:VA,,,V,0.012207,0.000000,0,-32767,+32767,1,1,P
2,A1:2:IA,,,A,0.254321,0.000000,0,-32767,+32767,1,1,P
3,A1:3:VB,,,V,0.012207,0.000000,0,-32767,+32767,1,1,P
4,A1:4:Voie Ana A1:4,,,V,0.012207,0.000000,0,-32767,+32767,1,1,P
5,A1:5:VC,,,V,0.012207,0.000000,0,-32767,+32767,1,1,P
6,A1:6:Voie Ana A1:6,,,V,0.012207,0.000000,0,-32767,+32767,1,1,P
7,Fréquence:1:F1,,,Hz,0.000500,50.000000,0,-32767,+32767,1,1,P
8,Charge DSP:,,,,1.000000,0.000000,0,-32767,+32767,1,1,P
9,RMS:A1:1:VA,,,V,0.012207,0.000000,0,-32767,+32767,1,1,P
10,P Active (PA):Tensions,,,kW,0.071931,0.000000,0,-32767,+32767,1,1,P
11,P Active (PB):Tensions,,,kW,0.003453,0.000000,0,-32767,+32767,1,1,P
12,P Active (PC):Tensions,,,kW,0.003453,0.000000,0,-32767,+32767,1,1,P
13,P Tri Active (P):Tensions,,,kW,0.078836,0.000000,0,-32767,+32767,1,1,P
1,D01:1:Voie Log D01:1,,,0
2,D01:2:Voie Log D01:2,,,0
3,D01:3:Voie Log D01:3,,,0
4,D01:4:Voie Log D01:4,,,0

IIII=Sampling rate

0000 : 1600Hz
0001 : 3200Hz
0002 : 6400Hz
0003 : 12800Hz
0050 : for the file measured at 50Hz
0060 : for the file measured at 60Hz

Ou

Integration
0001 : 1 Period (20ms à 50Hz)
0002 : 2 Period (40ms à 50Hz)
…….

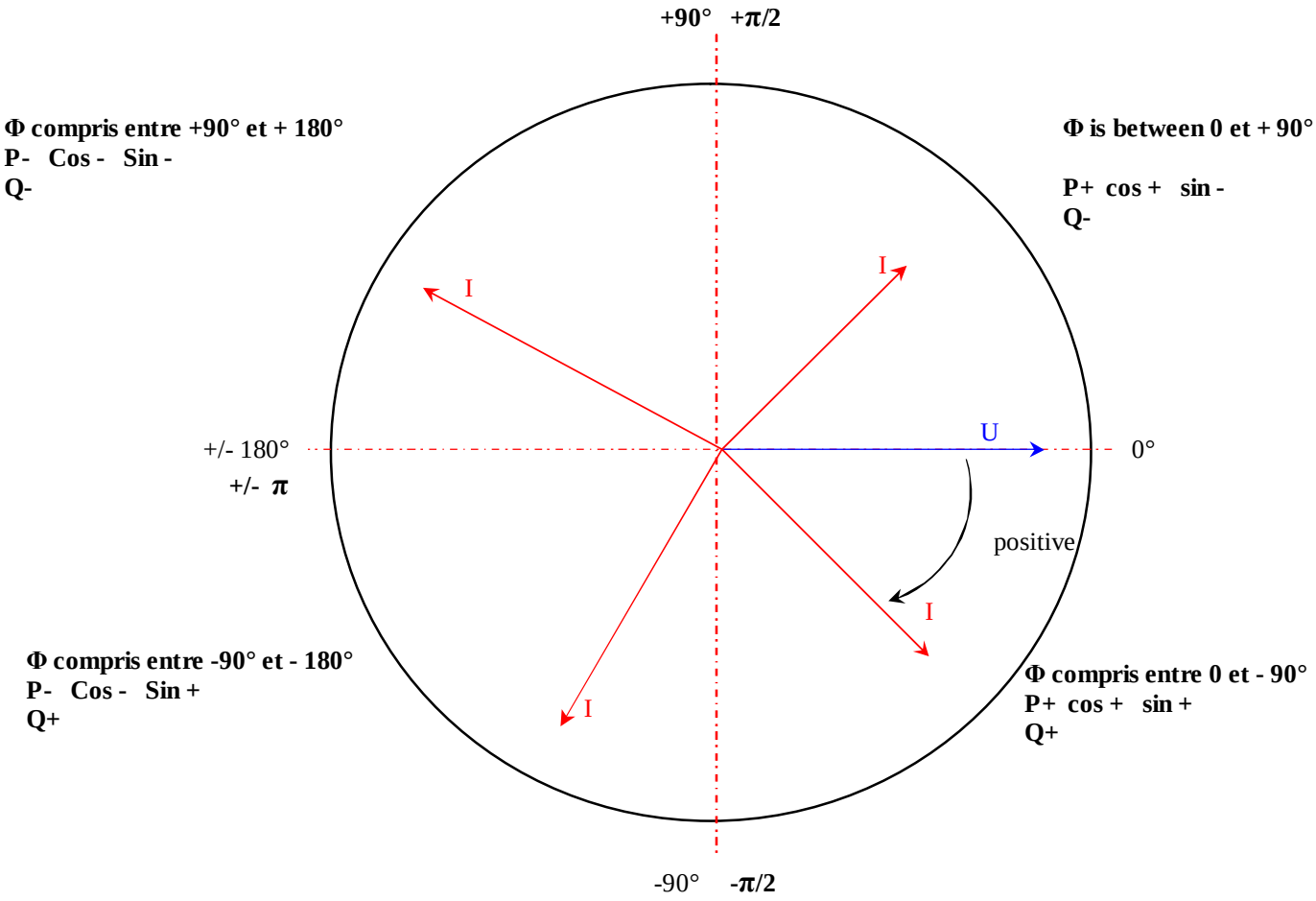
NC=Name of the channel or group

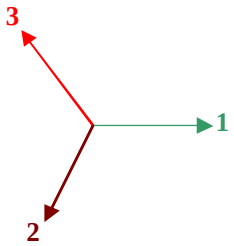
In case of continuous trend mode, only one file / 24H is generated. If the APR64 is reprogrammed a new session is issued the current file is closed.

Appendix 4 - Sign convention

The powers active and reactive are always positive when they are from Outgoing to Ingoing

The angle is always measured from Voltage to current



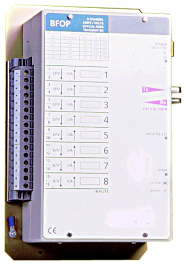


Direct system

Glossary

APR Network Disturbance Analyzer (**A**nalyseur de **P**erturbations **R**éseaux). Our company develops a complete range of analyzers and DFR (APR64 / APR64m).

BFOP



Optical fiber unit for APR (**B**oîtier **F**ibre **OP**tique pour APR).

This unit allows to transmit the analog measurements from APR.

Note : The BFOP is set by a supplied DSPDEP software.

Comtrade

International format of data exchange.

Active Cursor

Cursor displayed by the filles arrow

Inactive Cursor

Cursor displayed by the empty arrrow

Unbalanced

est l'état dans lequel la valeur efficace des tensions de phases ou les déphasages entre phases consécutives d'un système triphasé ne sont pas égaux.

$$Déséquilibre = \frac{Tension\ inverse}{Tension\ directe} \text{ x } 100$$

DRU

Digital **R**emote **U**nit Rack used to measure remotely digital channels

EN 50160

Quality norm

Harmonics

Multiple of a basic frequency

Example :

The harmonic 2 of a 50Hz signal is a 100Hz signal.

The harmonic 3 of a 50Hz signal is a 150Hz signal.

3 % of harmonic 5 of the 50Hz signal means that a 250Hz signal of which value is 3 % of the fundamental (50Hz) is over the 50Hz signal.

Hysteresis

Shift-out between up and down the threshold.

Import

Transfer measurements or programs from the APR towards the PC.

Inhibition

Minimal duration of the default before triggering of a recording sequence and a creation of a file. The inhibition duration allows to avoid transient phenomena.

Time before retriggering

It's the minial time between 2 faults in order to be triggered (Filter)

IRIGB

Time synchronization protocol

IRIGJ

Time Synchronization protocol

NMEA

GPS protocol for time synchronization

NTP

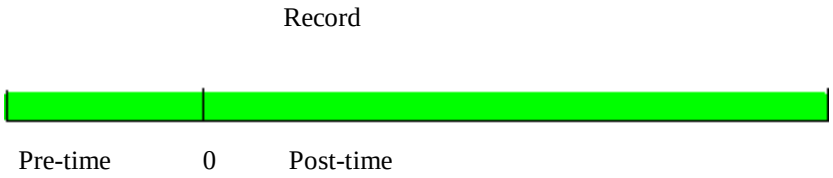
Network Time Protocol

PPS

Pulse per second (Digital signal from Time receiver)

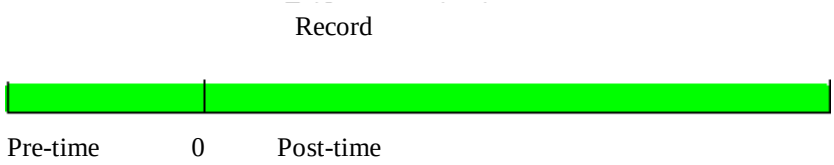
Post-time

Duration recorder after the T0 time (Trigger)



Pre-time

Duration recorded before the trigger (T0)



Apparent Power

$S = U \times I$

Reactive power

$Q = U \times I \times \sin \Phi$ of teh fundamental

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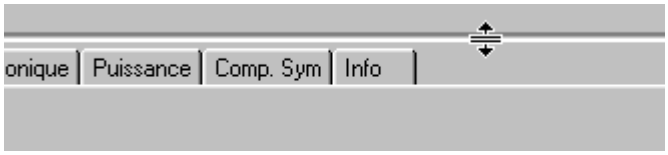
Split

Allow to change the size of the windows.



Horizontal and vertical

CT

Current Transformer

VT

Voltage Transformer

Trigger

Event which causes a record.